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THE SECTION OF SURGERY of the Massachusetts Medical Society convened at nine-fifteen o'clock in the Ball Room of the Hotel Statler, Boston, Massachusetts, Dr. Charles G. Mixer of Boston presiding.

CHAIRMAN MIXER: The Surgical Section will please come to order.

The subjects for discussion this morning are the different phases of the acute surgical abdomen. As these papers all hinge one upon the other, we are going to postpone discussion until the end of the program.

The first paper on the program is "Acute Surgical Lesions of the Lower Abdomen, by Dr. Peer P. Johnson of Beverly.

DIAGNOSIS AND MANAGEMENT OF THE ACUTE SURGICAL LESIONS OF THE LOWER ABDOMEN

BY PEER P. JOHNSON, M.D., F.A.C.S.

THIS paper comprises the acute surgical lesions of the lower abdomen with the exception of those causing intestinal obstruction or produced by trauma. Of these lesions, acute appendicitis, extra-uterine pregnancy and ovarian cyst with a twisted pedicle are, in the order named, the most common. Acute perforations of ulcers of cecum, ileum and sigmoid, idiopathic peritonitis, diverticulitis and mesenteric thrombosis are more rare. Without prompt surgical intervention all of these may produce grave derangements or prove fatal, therefore their early recognition is important.

Pain is the first and most striking symptom and its mode of onset, character, location and radiation are the important points in the development of the diagnosis. The patient's reaction to pain, his outcries, contortions, respirations and posture, as well as evidences of prostration, will frequently give a clue both as to the location and severity of the lesion. The past history may be important and should always be taken. The physical evidences of disease will be found by abdominal and rectal examinations supplemented by a vaginal examination when possible. In the abdominal examination the loins are frequently neglected, yet in the right

loin the tenderness and spasm of a retrocecal appendix will often be most apparent. It is astonishing how infrequently a rectal examination is made. It is as important in children as in adults and the information obtained by it may clear up many a doubtful or obscure problem. The diagnosis of a pelvic appendix may be confirmed; a pelvic abscess or an unsuspected ovarian cyst may be found. In addition to these local examinations, a general examination should always be made not only for the further information which may have some bearing on the diagnosis but also in order that a true picture of the patient's general condition may be had. Failure to make this general examination may lead to ludicrous errors. As illustrative of this, I have on three different occasions, found patients prepared and waiting for an appendectomy who presented symptoms of high temperature, rapid pulse, abdominal distension, pain, and a leucocytosis, on whom the examination had been confined to the abdomen. The symptoms, however, were due to an acute follicular tonsillitis about which there had been no complaint.

Urine and blood examination should be done as a matter of routine. The presence of large amounts of pus or fresh blood in the urinary sediment may throw suspicion on the kidney as a source of pain, and acetone in large amounts in children may suggest cyclic vomiting. In the blood examination not only the leucocytosis should be determined but also the percentage of polymorphonuclears for this is the index of the severity of the lesion. In the presence of acute suppurative processes, fresh blood and other foreign material in the peritoneal cavity there will be a leucocytosis and an increase in the percentage of polymorphonuclears. When the suppurative process has become localized and definitely walled off the leucocyte and polymorphonuclear count falls or becomes normal.

Probably the blood count is of the greatest value in determining the severity of the lesion in acute appendicitis. When the polymorphonuclear percentage is 70, or below, a suppurative or gangrenous process may be ruled out and operation delayed or postponed with safety. It is difficult to be so sure of the severity of the

process when the percentage of polymorphonuclears is between 70 and 80. I have seen beginning peritonitis with percentages below 80 but above this point one may feel sure that he is dealing with a dangerous lesion which should have immediate treatment. The higher this percentage goes the more certain one may be and the higher the percentage of polymorphonuclears in proportion to the leucocytosis, the more grave the disturbance. While the blood examination may not be the factor which determines the necessity for an operation in acute appendicitis certainly no operation should be postponed in which it has not been done. It has been my misfortune on two occasions to mistakenly operate for acute appendicitis during the first week in typhoid fever. Curiously enough both these instances occurred in families of physicians and a blood examination was neglected. Had it been done it is quite possible that operation might have been deferred and a longer period of observation disclosed the true nature of the disease.

The blood examination may be of some significance in extra-uterine pregnancy. There is a leucocytosis and increase in the percentage of polymorphonuclears in proportion to the fresh blood poured into the peritoneal cavity. In the early stages of extra-uterine pregnancy, when but small amounts of blood are extravasated into the pelvis, the leucocytosis may be no more than that of a high normal. As the amount of blood increases the leucocytosis rises rapidly, often above 20,000, and reaches its height with a massive hemorrhage when the leucocytosis may be 30 or 40 thousand and the percentage of polymorphonuclears above 90. In fact this condition gives us some of our highest blood counts. The leucocytosis generally reaches its height within a few hours after each attack of pain and falls as the blood becomes absorbed or encysted. Therefore the leucocytosis and increase in the percentage of polymorphonuclears may be a very good index of the extent of the fresh hemorrhage into the peritoneal cavity. Farrer¹ calls attention to the fact that a steadily rising leucocyte count indicates active bleeding much earlier than does the number of red cells or the amount of hemoglobin.

Examination of the blood and urine may often add nothing to our knowledge of the case but, if it has been done, we shall at least have no regrets for our negligence when, as will occasionally happen, we fail to find a lesion warranting our operative interference.

Further resort to the laboratory may be had to determine the presence of gonococci in smears from the genito-urinary tract in doubtful pelvic conditions. The X-ray may be able to differentiate between stones in the kidney or ureter and appendicitis and, in children, between a pneumonia and an appendicitis.

Observation at frequent intervals, especially in acute appendicitis and extra-uterine pregnancy, may be necessary to confirm the diagnosis. During this period the patient should be kept as comfortable as possible and nothing done to obscure or aggravate his symptoms.

It ought to be unnecessary to mention the dangers of catharsis yet hardly an acute appendix reaches the operating table in which it has not been used, generally at the instigation of some member of the family but sometimes of the doctor. Catharsis causing increased peristalsis spreads infection and prevents the formation of limiting adhesions. It should never be employed in any case of acute abdominal pain until acute surgical lesions can be ruled out. Enemata are not always as harmless agents as they are supposed to be and some definite reason should exist before they are employed. A distended bowel may be of service in limiting a spreading peritoneal infection. Enemata may cause a lowering of the barriers. A localized abscess with lightly limiting adhesions may be ruptured by an enema as I have noted on several occasions. Enemata in perforation of the cecum, large bowel and sometimes lower ileum serve only to inundate the peritoneal cavity, spread infection and limit the patient's chances of recovery.

ACUTE APPENDICITIS

Acute appendicitis is still by far the most frequent, the most fatal and therefore the most important acute surgical lesion of the whole abdomen. In spite of our familiarity with it there still remain difficulties in diagnosis and in too large a percentage is operation delayed until serious complications have occurred.

With our present knowledge the death rate should be on the decline but Willis² has recently pointed out that instead of a decline there was a distinct rise of 31% from 1900 to 1923. Commenting on this fact he states: "It is appalling to realize that the number of deaths annually from appendicitis equal all those from salpingitis, pelvic abscesses, surgical lesions of the pancreas, spleen and thyroid, gall stones and ectopic pregnancy. The annual toll taken by appendicitis almost equals the combined total of intestinal obstruction, gall stones, gastric and duodenal ulcer."

In Massachusetts for the year 1926, there were 521 deaths from appendicitis. This figure however gives but little idea of the serious complications and prolonged convalescence resulting from failure to recognize the condition and apply proper treatment.

The ideal, of course, would be to recognize the diseased appendix early enough to effect its removal while the infection is still confined to that organ.

To determine how nearly we were accomplishing this, a review was made of the last 300 cases of acute appendicitis treated at the Beverly Hospital. Of these, 78, or 26%, had pus in the peri-

toneal cavity, localized 16 and free 62 times. For the whole series there were 9 deaths, a mortality of 3%. In the 222 cases in which the infection was still confined to the appendix, there was but one death, a mortality of .4%. In the 78 cases of pus, whether localized or free, there were 8 deaths, giving a mortality 25 times as great, or 10%.

The symptoms and course of acute appendicitis are too well known to require discussion. The diagnostic symptoms of acute pain, tenderness and spasm, localized at McBurney's point, are typical. Most of our errors arise from our misinterpretation of symptoms as a result of their variations from the ordinary.

Analyzing the 300 cases already referred to, one finds the following reasons for the delay in operation:

1. The attacks of pain were so slight as to in no way interfere with the patient's normal occupation until the symptoms of acute perforation made their appearance.

2. Attacks of pain came only at long intervals and because of an absence of very marked physical signs the physician felt that the attack was over.

3. Although the attacks of pain and its radiation were typical, the tenderness and spasm at McBurney's point were so slight as to be negligible. The location of the appendix or the stage of the disease may account for this. When the appendix is retrocecal or in the pelvis, tenderness and spasm referred to McBurney's point may be lacking. A retrocecal appendix however gives marked tenderness and spasm in the loin and Murphy's kidney sign is often present. If one confines his examination to the anterior abdominal wall he will overlook these positive findings. An inflamed appendix in the pelvis may be palpated by rectum. If this is not possible there will at least be tenderness. If the patient is seen during the stage when the appendix has become gangrenous or just perforated, and before peritoneal irritation sets in, there may be freedom from pain as well as absence of tenderness or spasm.

4. Indulgence in an abnormal meal often caused both the patient and the physician to believe that the symptoms were due to an acute indigestion and only extension to the peritoneal cavity called attention to the true diagnosis. The failure to make a careful abdominal examination in such cases is generally accountable for the mistake. Diagnosis of acute indigestion should never be made until other conditions giving rise to abdominal pain have been definitely ruled out.

5. When acute appendicitis was intercurrent with some other disease it was often overlooked. This was especially true in children. Acute appendicitis occurred during the acute infections of the ear, of the tonsils, respiratory tract and acute contagious diseases. Complaints of acute abdominal pain in any of these conditions should be given serious consideration.

6. Absence of pain as the initial symptom

accounted for the delay in recognition of the disease in several cases. There was complaint of malaise, nausea and vomiting, and abdominal soreness but absolutely no pain until several days after the onset at which time operation revealed perforation with free pus.

By most surgeons at least it is recognized that neither the seriousness of the lesion nor its outcome can be determined by the symptoms or physical findings. It is still no uncommon occurrence to find excellent medical men hesitating to recommend operation when the temperature and pulse are near normal and there is but slight tenderness and spasm, yet the appendix may be already gangrenous and on the point of perforation. It is in this type of case that the presence of a high polymorphonuclear count, regardless of the amount of leucocytosis, is of especial value in enabling us to say that the condition is serious and delay dangerous.

The presence of a localized abscess is usually readily recognized by the increased tenderness and spasm. By gentle palpation from the normal towards the affected area the mass can, as a rule, be readily mapped out. When it is retrocecal there will be an exaggeration of the tenderness and spasm in the loin. With extension of pus to the peritoneal cavity without localization, there is often a period of calm, after which the pain becomes severe and generalized. The abdominal tenderness may be so marked that even the bedclothes cause discomfort; muscular spasm becomes generalized but most marked on the right side. The abdominal wall is usually retracted.

The limits of this paper do not permit a consideration of all the different conditions which may simulate acute appendicitis. No attempts will be made to differentiate it from the other acute surgical lesions. Pyelitis, stone in the kidney or ureter, acute salpingitis and pneumonia in childhood require consideration.

Pyelitis is more common in women and children. There may be a history of frequent, burning micturition and chills. The pain is referred to the kidney and there is costovertebral tenderness. Murphy's sign is often present. The urinary sediment shows abundant pus. There may be pus cells in the urine in acute appendicitis and the two diseases may be coexistent.

The pain of stone in the kidney or ureter is much more severe and begins in the loin, radiating to the bladder and thigh. This radiation occasionally occurs in acute appendicitis, due to irritation of the genitoocrural nerve. Unless complete occlusion of the ureter takes place, microscopic examination will show numerous red blood cells in the urinary sediment. The temperature and white count are normal. The tenderness is over the kidney and Murphy's sign is present. There may be a tenderness along the course of the ureter. The X-ray and cystoscopic examination may be of help in doubtful cases.

In acute salpingitis the pain is low and the tenderness and spasm are lower than in appendicitis and usually on both sides of the abdomen. There is a history of previous exposure to infection, abortion or puerperal sepsis. Gonococci may be found in the pus in Bartholin's glands, urethra or cervix. Pressure on the cervix causes pain. As the disease is usually bilateral both tubes may be swollen and tender. When the right tube alone is involved the liability to error is much greater but careful study will usually prevent this.

Pneumonia in childhood quite frequently begins with acute epigastric pain, nausea and vomiting and examination shows abdominal resistance but careful, patient palpation reveals the absence of the localized tenderness or muscle spasm of acute appendicitis. At onset the temperature is higher and the pulse rapid, and the respiratory rate increased out of proportion to the pulse. A respiratory grunt as well as exaggerated movements of the alae nasi may be suggestive. Cough may be present but is often absent. Examination of the lungs may show nothing but diminished resonance and breath sounds. Early there may be no suggestive sounds in the lungs. In an acute perforative appendicitis, not seen until after a diffuse peritonitis is well established, the differentiation from a pneumonia may be exceedingly difficult inasmuch as all the signs just enumerated as suggestive of a pneumonia may be present while the abdominal symptoms may be very indefinite.

Inasmuch as perforation may take place within the first 24 hours, the treatment of acute appendicitis should be early operation. The risk of operation during the acute stage is but little if any greater than during the quiescent period. Waiting for an interval operation is fraught with serious danger. Some exception may be taken to this statement when the blood and polymorphonuclear counts, on repeated examination, remain within normal limits, or, when in the presence of an increase of polymorphonuclears, a drop occurs. With the presence of a polymorphonuclear percentage of 80, delay in operation should not be considered and this fact becomes even more emphatic with percentages of 90 or over. If for any reason operation is inadvisable the Ochsner treatment, in all its details, is the safest course. As practised today this consists of Fowler's position, starvation, avoidance of catharsis, salt and glucose solution by rectum and sufficient morphine to relieve pain and quiet peristalsis.

For fear of rupture, localized abscesses should be opened and drained as soon as recognized and, in such cases, the appendix should not be removed when there is danger of spreading infection to the peritoneal cavity. There is a great temptation to remove the appendix in the presence of a very slight amount of pus but if it is embedded in dense, plastic adhesions, which include the ileum, there is danger of stripping off

its peritoneal coat with the subsequent formation of crippling adhesions and intestinal obstruction.

Appendices which are left are rarely destroyed by the disease and should be removed at a later date when the acute inflammatory process has entirely subsided.

In the presence of free pus in the peritoneal cavity the appendix should be removed as rapidly as possible. If there is but little pus and but slight peritoneal injection, drainage can be safely omitted, although, for my own part, I feel safer with a small rubber drain. In the presence of abundant pus and marked peritoneal injection drainage, at least to the pelvis, should be established either through the operative wound or a stab wound. No attempts should be made to remove all the pus nor should the peritoneal cavity be irrigated for fear of dissemination of the infection. For the ordinary types of diffuse peritonitis, with the patient in Fowler's position, practically all of the pus left in the peritoneal cavity will find its way to the surface within the few hours in which drainage is effective. No drainage is effective in a true general peritonitis and here the outcome depends on the virulence of the infective organisms and the resistance of the patient.

Enterostomy and jejunostomy as a primary measure, or later in the paralytic ileus of general peritonitis, are of doubtful value. Following operation the Ochsner treatment with the patient in Fowler's position should be religiously carried out. The stomach tube will save more lives than an enterostomy. Vomiting, persistent regurgitation and hiccoughs are an indication for its use but it must be remembered that acute dilatation of the stomach may exist without any of these symptoms. Pronounced upper abdominal distention, unrelieved by enemata, and a very rapid pulse are suggestive of this condition.

Operation offers very little in the late stages of general peritonitis when the patient is profoundly toxic. At this stage the temperature is low, the pulse rapid and feeble, there is cyanosis and the abdomen is distended and usually insensitive, peristalsis is absent. The blood examination may show an absence of leucocytosis and the percentage of polymorphonuclears may be low. Treatment by the Ochsner method is our best resource. Occasionally localization will take place and the patient recover.

EXTRA-UTERINE PREGNANCY

Early diagnosis is important to avert the serious consequences incident to complete tubal abortion or rupture with massive hemorrhage. The condition should be suspected in women of child bearing age complaining of low abdominal pain and irregular bleeding. The diagnostic symptoms in the pretragic stage are attacks of low abdominal pain with bloody vaginal discharge. Pressure on the cervix causes pain. There is a doughy mass in the posterior cul-de-sac and a tender mass in one of the lateral

cul-de-sacs. Between attacks there may be abdominal soreness and painful defecation. Menstruation may have been delayed, skipped, or occur at the proper time and continue the usual number of days, normal in amount, after which it may persist as a scanty, dark brown, bloody discharge. It is often so slight as to be referred to as merely a spot or appear only at the time of urination or defecation.

The symptoms of the tragic stage are more severe. The pain is agonizing and rapidly becomes generalized. In addition, there is frequently a pain referred to one or the other breast and the shoulder, and a dyspnoea due to diaphragmatic irritation. The signs of internal hemorrhage and shock are present.

The treatment is operation at any stage. A difference of opinion exists only as to whether operation should always be done irrespective of the degree of shock. My experience has led me to adopt a waiting policy in the more pronounced types of shock. Previous to operation morphine should be given for pain but under no circumstances should stimulation be employed. No attempts should be made to increase the amount of circulating fluid by the use of salt solution except at operation. Blood transfusion at or after operation is more effective but will rarely be required.

OVARIAN CYST WITH TWISTED PEDICLE

An ovarian cyst with a twisted pedicle will be recognized by a low, agonizing pain usually referred to the affected side and radiating to the back, hip or thigh. The pain is steady or paroxysmal and is often accompanied by prostration. There is abdominal tenderness and spasm. When the cyst is large it can be readily made out by abdominal palpation; when small by rectal or vaginal examination. The symptoms may suggest extra-uterine pregnancy but the history and the feel of the tumor will usually clear up the diagnosis. The history will frequently show previous attacks of severe, often agonizing pain of short duration. Renal colic or an acute appendicitis may be suspected but the definite signs of these conditions will be absent. Unless a rectal or vaginal examination is made the condition will be overlooked and, in my experience, this has often proved to be the case. My youngest patient, a girl of 7, was operated upon under the mistaken diagnosis of acute appendicitis with abscess. The treatment of course is early removal of the affected ovary.

ACUTE PERFORATIONS OF ULCERS OF ILEUM, CECUM AND SIGMOID

These acute perforations occur infrequently. The ulcers of the cecum and sigmoid are usually tubercular or carcinomatous while those of the ileum may be of the simple, tubercular or typhoidal type.

The typhoidal perforations occur in the third week of the disease. The symptoms, which are

right sided pain, tenderness and spasm, are often obscured by the mental state of the patient. A leucocytosis occurs which owing to the previous leucopenia may be only relative. The symptoms will be the more readily recognized if during the course of the disease daily abdominal and occasional blood examinations are made.

In the perforations of simple and tubercular ulcers, because of the liquid content of the bowel, the soiling of the peritoneum may be extensive and the symptoms may resemble those of a perforated duodenal ulcer with which they are apt to be confused.

Perforations of both cecum and sigmoid present symptoms more local in character and may be mistaken for an acute appendicitis.

While an accurate diagnosis will rarely be made, the symptoms of pain, tenderness and spasm will at least warrant early operation. The perforation should be closed. With marked interference with the lumen of the bowel, enterostomy, entero-enterostomy, colostomy, may be required in accordance with the particular needs of each case. Carcinomatous perforations will invariably require a colostomy, resection being left for a more favorable time.

MESENTERIC THROMBOSIS

Mesenteric thrombosis is an uncommon and usually fatal condition. The onset is with agonizing pain which is frequently paroxysmal, nausea and vomiting and marked prostration. The vomitus may contain blood. There may be obstipation but more frequently there are bloody stools. The physical findings are general abdominal tenderness and rigidity.

Etiological factors which may be looked for are arteriosclerosis, valvular heart disease, stasis of the portal circulation, infection of the appendix and pelvic organs.

Immediate resection of the affected portion of the small intestine offers the only hope.

ACUTE DIVERTICULITIS

In my experience acute infection of Meckel's diverticulum has been rare and a diagnosis has not been made until after operation. Its symptoms are those of an acute appendicitis, to which may be added, owing to the liability of obstruction of the ileum, the signs of acute intestinal obstruction. When in a suspected acute appendicitis the appendix is found to be normal, the possibility of an acute diverticulitis should be borne in mind.

PNEUMOCOCCUS PERITONITIS

Acute peritonitis of the pneumococcus origin occurs in adults but is primarily a disease of childhood, being three times as frequent in girls as in boys. It may follow or be intercurrent with the acute infections of the respiratory tract especially lobar pneumonia. Cases do occur without antecedent cause especially in girls. There is severe abdominal pain, nausea and

vomiting, diarrhoea and marked toxemia—the toxemia being out of proportion to the abdominal symptoms. The abdominal tenderness is diffuse and, as a rule, most marked below the level of the umbilicus. There is abdominal distension and muscular rigidity which may be marked or only slight. The diagnosis can rarely be definitely made before operation but it should be suspected in the presence of a diffuse peritonitis for which no other cause can be found. It is not infrequently mistaken for an acute appendicitis with peritonitis during or following a respiratory infection. The older method of medical treatment until localization took place appears to be giving way to earlier operation with drainage. The presence at operation of a greenish, odorless pus will be suggestive.

REFERENCES

- 1 Farrer, Lillian K. P.: The Value of the Leucocyte Count as an Aid to the Diagnosis in Ectopic Gestation. *Surg., Gynec. and Obst.*, 1925, XLII, p. 655.
- 2 Willis: The Mortality in Surgical Diseases. *Surg., Gynec. and Obst.*, Mar., 1926, VXLII, p. 319.

CHAIRMAN MIXTER: The next paper on the program is "Acute Surgical Lesions of the Upper Abdomen," by Dr. Edward P. Richardson of Boston.

ACUTE SURGICAL LESIONS OF THE UPPER ABDOMEN

BY EDWARD P. RICHARDSON, M.D., F.A.C.S

THE subject of this symposium, the acute surgical abdomen, is a convenient phrase which brings to mind a clinical picture varying in its details, but with certain features which we recognize as presenting an immediate threat to life. We have learned that the cause of this picture is ordinarily either inflammatory or mechanical in nature, and relievable in many instances by operative measures.

The most significant symptom is abdominal pain, sometimes intermittent and cramplike from interference with a muscular organ, sometimes continuous from stimulation of the parietal peritoneum, from distention of a viscus, or from torsion and obstruction of vascular supply. The defense mechanism of the abdominal parietes is frequently called into play, and we can detect on examination abdominal tenderness with associated increase in muscular resistance. Vomiting is usual, either as a reflex, less often as evidence of regurgitation into the stomach in conditions of obstruction or paresis lower in the intestinal tract. The associated constitutional disturbance varies in degree from a slight disability to profound collapse. Elevation of temperature, increase in pulse, and leucocytosis, are common but not essential. The appearance of the patient, the type of respiration, and the degree of prostration are valuable confirmatory signs.

We are fortunate if we can separate these

cases from medical conditions which simulate the picture, such as pneumonia, particularly in children, lead colic, tabetic crises, coronary thrombosis, and acute gastrointestinal upsets. When recognized, treatment by operation comes into question. However, an accurate diagnosis is extremely desirable, not only because delay may be wiser than immediate operation in a given case, but in order to place the operative incision correctly, to find the lesion with the least possible delay and handling of viscera, and to estimate the prognosis and operative resistance in a given case.

In the sense of the present discussion, therefore, only those acute surgical lesions producing the symptom complex above described will be considered; other emergencies, such as massive bleeding from the stomach, are excluded. In the upper abdomen the lesions most frequently met are those of the biliary apparatus, particularly acute cholecystitis; the perforation of duodenal or gastric ulcer leading to peritonitis; a high appendicitis; obstruction of the upper small intestine, transverse colon, or splenic flexure; pancreatitis; and various rare conditions, such as acute dilatation of the stomach or diaphragmatic or retroperitoneal hernia with strangulation.

When acute abdominal symptoms lead us to suspect the existence of a surgical emergency, what particular evidence causes us to locate it in the upper abdomen? In the first place, the situation of the pain. If this is in the epigastrium, or high under the costal margin, a lesion in the upper abdomen is suggested, but may or may not be present, as will be seen later. On the other hand, pain situated at the level of the umbilicus or below is unlikely to be caused by a lesion in the upper abdomen. More reliance can be placed on the maximum area of tenderness and muscular resistance. In incipient peritoneal infection, this can usually be clearly made out, and points of the area of maximum irritation, and hence by inference to the viscus involved. At times in sudden and extensive invasion of the peritoneal cavity, as in perforations of the gastrointestinal tract, the tenderness and spasm may be general. However, on careful examination, comparing the various areas with each other, it is usually possible to determine the quadrant of the abdomen chiefly affected. The previous history may afford important confirmation. Thus attacks of colic occurring at night, especially if there has been any jaundice, point to some disease of the biliary system, while periods of indigestion with epigastric distress, relieved by foods or soda, suggest the existence of peptic ulcer. Similarly the presence of an operative scar, or a story of previous attacks of vomiting and obstipation, may suggest intestinal obstruction. Finally, there may be some sign such as jaundice, hematemesis, or red cells in the urine, which points directly to upper abdominal disease.

The location of the pain with reference to

visceral disease within the abdomen is of particular interest. Mackenzie¹ has stressed the fact that visceral pain is not felt in the position at which the viscus is situated, but is referred by the individual to the distribution of the peripheral nerves, corresponding in level to the point where the irritation from the viscus enters the spinal cord. Such pain is usually felt in the median line of the body, somewhat diffusely. Thus painful sensations arising from the stomach and duodenum are felt in the epigastrium, from the appendix and terminal ileum at about the level of the umbilicus, and from the large intestine below the umbilicus in the hypogastric region. If we add to this conception the idea that irritation of the parietal peritoneum, whether from infection or by traction from peritoneal attachments, produces a pain or soreness which can be fairly accurately located, we have an explanation of the cause of pain which is useful at least in correlating clinical observations.

Under certain conditions, acute lesions in the lower abdomen may produce pain in the upper abdomen. Occasionally the pain of onset of appendicitis is felt in the epigastrium, instead of rather diffusely in the centre of the abdomen. Recently I operated on a man for acute obstruction after several crises of epigastric pain. Although the pain was felt in the epigastrium, the cause of the obstruction, a lymphosarcoma of the ileum, was adherent in the true pelvis. I could quote other similar cases. It is clear that in intestinal obstruction a considerable extent of the tract above the lesion may be involved in painful contractions, and those arising in the upper small intestine may well be felt in the epigastrium.

When the lesion is in the upper abdomen, symptoms in the lower abdomen occur more rarely, and are deceptive particularly in two conditions. Thus a carcinoma of the transverse colon or splenic flexure may produce the cramp-like pain in the lower abdomen characteristic of vigorous peristalsis in the large bowel. This location of pain in the lower abdomen when obstruction of the colon exists, although a good general rule, is not without exceptions. Recently a man with a tumor of the transverse colon near the splenic flexure complained of pain below the umbilicus; when, however, acute obstruction developed, this pain was overshadowed by epigastric pain, caused I believe by the peristaltic efforts of the small intestines, which were found distended at operation. The second instance occurs occasionally in acute perforation of a duodenal ulcer. The escaping fluid, gravitating along the space between the ascending colon and the lateral abdominal wall, may produce the maximum tenderness and muscular spasm in the region of the appendix, and so not infrequently leads to a diagnosis of appendicitis, and consequently to a low abdominal incision. The danger here is that the appendix, which is often injected, should be held responsible for the

peritonitis. But when it is seen that the injection is shared by other peritoneal surfaces, and the amount of exudate is out of proportion to the degree of inflammation of the appendix, the actual lesion in the duodenum is not difficult to discern.

Acute perforation of a duodenal or gastric ulcer is the most dramatic of abdominal emergencies. Ordinarily, if the history is taken with care, a story suggestive of ulcer will be obtained. But in about 20 per cent of the cases, the perforation occurs without premonitory digestive symptoms. The suddenness and severity of the pain, and the extreme degree of muscular rigidity ordinarily make the diagnosis clear, unless the symptoms are masked by morphia. Occasionally the cause of symptoms may remain in doubt, particularly in cases where the infection localizes between the transverse colon and the liver, or in those seen after twenty-four hours, when peritonitis is advanced and distention is beginning. Absence of liver dulness, formerly stressed as a sign of perforation, occurs too irregularly to be of value. But the condition which causes it, gas between the liver and abdominal parietes, can be shown in another way. If an X-ray is taken in a sitting posture, a gas bubble is frequently shown between the liver and diaphragm, and is positive evidence of a perforation somewhere in the gastrointestinal tract, and consequently of the necessity of exploration.

Ordinarily the diagnosis is sufficiently definite not only to show clearly the need of immediate operation, but to place the abdominal incision properly. In operating the essential thing is closure of the perforation, which is best done by infolding the gastric or duodenal wall with two rows of sutures. Sometimes induration makes this difficult, but it can usually be accomplished by placing the sutures at a considerable distance from the perforation. A doubtful suture line should be reinforced with omentum. The debatable points concern drainage and gastroenterostomy. Since the peritonitis is at first essentially chemical, drainage is usually not necessary in cases operated on during the first twelve hours after perforation. Later than this I believe it desirable. It should be used in any case where closure of the perforation is not secure.

While it is usually stated that nearly half the patients are relieved of digestive disturbance after recovery from an acute perforation, Drs. F. Fremont-Smith and M. A. Melver found that of 17 cases carefully followed after closure alone, 11 showed severe recurrence of digestive symptoms within 6 years*. Nevertheless this finding should not be taken as an argument in favor of adding a gastroenterostomy after closure of the perforation, since we are concerned in saving life, and not with future freedom from symptoms. It can hardly be considered that gastroenterostomy is likely to reduce the primary mortality from peritonitis and its complications,

*Personal communication.

while if the patient survives it can be carried out when indicated as a secondary procedure. The question as to whether to add a gastroenterostomy depends in part on the skill and experience of the operator. I believe that it is inadvisable at the time of perforation except in vigorous individuals during the early stage of peritoneal infection, and in them only if the pylorus or duodenum seems constricted. In elderly patients, in advanced peritonitis, or in gastric ulcers away from the pylorus, I believe it is contraindicated.

The lesion most likely to be confused with perforation of a peptic ulcer is acute cholecystitis. In some instances, the onset of pain is equally sudden, although it is more likely to take an appreciable time to reach its maximum intensity. The location in the epigastrium is similar, but radiation to the back is more constant. While few persons experience the pain of perforation more than once, the pain of acute cholecystitis is likely to be a familiar event. It begins as an attack of biliary colic and is likely to be recognized as such by both patient and physician. Local signs of peritoneal irritation develop more slowly. There may be tenderness but in the early hours spasm is likely to be absent. The patient is likely to be restless in contrast to the tense immobility after perforation. The essential distinction between acute perforation and cholecystitis is the slow progression of abdominal signs in the latter. In perforation the whole abdomen may be rigid within an hour, while in cholecystitis this change rarely progresses beyond the upper abdomen. Ordinarily morphia is given in full expectation that the pain will pass off, and morning finds the patient shaken though comfortable. But as the effect of morphia vanishes, the pain returns, not perhaps in its original severity, accompanied by well-defined spasm and tenderness in the right upper quadrant. Occasional vomiting is usual, and may be persistent. Two or three degrees of fever are likely to develop and sometimes, at the end of twenty-four hours, a tinge of jaundice.

This is a surgical emergency, in the sense that a surgical consultation should be held. It is not an emergency in the sense that immediate operation should always be undertaken; this decision should be left to the surgeon. If these cases are not operated on, the usual course is as follows: About the third day muscular spasm diminishes, so that we are often able to feel a distended and tender gall bladder, which in the majority of cases gradually lessens in size, and becomes less tender. The temperature becomes normal, and the jaundice clears so that often in a week or ten days the patient returns essentially to normal. In some individuals the development of acute cholecystitis is not wholly an unfortunate accident, because they usually submit willingly to operation on account of the persistence of the pain, while they are ready to put up indefinitely with brief attacks of colic.

In cholecystitis the striking thing is not that it should progress occasionally to gangrene of the gall bladder and peritonitis, or to acute pancreatitis, but that it should so frequently tend to subside without interference. I believe that this is because in the great majority of cases it is, at least at the onset, essentially a mechanical process. It is common to find a stone impacted in the cystic duct or lower end of the gall bladder, which becomes on this account congested and distended. Whatever infection is present is usually incidental rather than the actual cause of the lesion. It is only necessary to contrast the slight constitutional reaction, the unusual development of suppuration in the abdomen or the operative wound with the septic manifestations of acute appendicitis to realize that here is a condition in which infection plays on the whole a minor part.

During the last four and a half years there have been admitted to one surgical service at the Massachusetts General Hospital 215 cases of biliary disease, most of which I have seen at some part of their course. Of these 51 cases were acute or subsiding cholecystitis in which the general principle of treatment adopted was to delay interference until the subsidence of the immediate effects of the attack unless some special consideration made immediate operation desirable. Thirteen patients received immediate operation, the remaining 38 after a delay averaging four days, which, since they were admitted about five days after onset, brought the operation about the tenth day of the disease. There can be little question that cholecystectomy at this time is safer than during the acute stage. The question is how great a risk was taken with regard to complications. Damage to the liver is difficult to estimate. My belief is that possible increase of liver damage through delay is more than compensated for by return toward normal function in a greater number of cases. In the whole series there was one case of diffuse peritonitis due to perforation, three of local abscess in the region of the gall bladder, and two cases of acute pancreatitis, one mild and one severe. One patient was admitted moribund from diffuse peritonitis; the gall bladder was drained, but was not shown to be the actual cause of the peritoneal infection.

There is, therefore, the risk of serious complications which may be obvious and lead to immediate operation, or may be latent during the period of delay and discovered unexpectedly on exploration. If simple drainage of the gall bladder were as good an operation as removal, the question of delayed as against immediate operation would not be so important. Time has shown that a large proportion of cholecystostomies require a secondary operation for recurrent stones or persistent infection; therefore an immediate cholecystectomy is extremely desirable if it can be safely done. But cholecystectomy carries a considerable risk during the acute stage of

cholecystitis, when patients are thrown off their physiological balance. From this comes the reason for delaying operation until the acute attack has subsided. The decision as to immediate or delayed operation is perhaps more difficult in private practice than with hospital patients, who are seen later in the disease, after its course is more apparent. In any event, the decision must be based on the individual case. If there is doubt as to the diagnosis, so that there is question of perforated peptic ulcer, appendicitis or pancreatitis, operation should be done at once. If the case is mild, or evidently subsiding, operation should be delayed. Should the severity of symptoms or the physical examination suggest extension of a septic process, exploration should be carried out promptly. But in case operation is forced on this account, the temptation to remove the gall bladder should ordinarily be resisted, in spite of the ease with which it separates from the liver in the acute stage, and drainage of the gall bladder only carried out. The patient and his family should appreciate that this may prove an incomplete operation necessitated by consideration for a safe recovery.

Other diseases of the biliary tract are not likely to demand operation as a surgical emergency. Obstructive jaundice and cholangitis require study, and should receive careful preoperative preparation, although procrastination may have serious results.

Recovery from acute pancreatitis appears to me to depend more on the intensity of the process than on any surgical measures taken for its relief. It shows a surprising range of variation, from a mild condition only recognizable by fat necrosis and slight induration of the pancreas which hardly affects the course of recovery after cholecystectomy, to a fulminating lesion causing death within a few hours. Clinically, it may be entirely overshadowed by an accompanying cholecystitis; it may be suspected as a complication by persistence of pain and vomiting with tenderness extending across the median line to the left; or it may develop with an intensity of pain, vomiting, and upper abdominal tenderness which combines the features of acute peritonitis and strangulation of the intestines. Immediate operation should be undertaken, and should provide drainage for any broken-down area of pancreas, as well as of the biliary tract. The acute stage is likely to be unrecognized, sometimes with a fortunate end result in the shape of a pseudo cyst or of a pancreatic abscess relievable by drainage.

Appendicitis as an upper abdominal disease may occur exceptionally, due usually to lack of descent of the caecum, which leaves the appendix in the subhepatic region. The onset resembles appendicitis in the normal situation, but the abdominal signs are less definite. Ordinarily such an appendix is well back in the kidney region, differing in this way from the gall bladder, the

fundus of which as it enlarges is usually close to the anterior abdominal wall. Consequently tenderness and spasm ordinarily occur late and may be more marked in the costovertebral angle than in front. The distinction between cholecystitis and appendicitis in this situation may be impossible, but the latter is suggested by a gradual onset and the slow development of abdominal signs. If appendicitis is suspected operation should be carried out without delay.

The majority of lesions causing acute intestinal obstruction occur in the lower rather than in the upper abdomen. The symptoms depend more on the level and character of the obstruction than on the part of the abdomen in which the obstruction is situated. We should remember, however, the possibility of strangulation in the region of the duodenojejunal fold, the foramen of Winslow, through the diaphragm, or through the transverse mesocolon after gastroenterostomy.

Lesions of the kidney are in themselves rarely surgical emergencies, and it is a misfortune when they are treated as such, since the proper operative procedure is usually only determined by careful study. However, they may cause confusion by being simulated by or simulating other abdominal conditions. The conditions causing most trouble in this way are calculus, hydronephrosis, and acute haematogenous infections. The location of the pain in the loin with downward radiation is usually characteristic, but in unusual instances it may be epigastric. The association of costovertebral tenderness and changes in the urine is usually significant, as is the absence of marked or increasing abdominal tenderness and spasm.

The great majority of acute emergencies of the upper abdomen fall under the heads previously discussed. Other conditions are rare, and usually not to be diagnosed. As a whole, these acute lesions present a searching test of diagnostic acumen and surgical judgment. Decision has to be based in many instances on history and physical examination, without essential aid from the laboratory. The most distressing errors come from haste in jumping at conclusions, and haste in undertaking operation. The time consumed in painstaking history and examination rarely count against recovery, while it may guard against a serious mistake. It is common experience to see minutes saved by a superficial examination and hours lost by lack of foresight and necessary delays in arranging for operation.

If the surgical treatment of abdominal emergencies can be carried out well without laboratory facilities, it can be carried out better with them. Not only are we given diagnostic aid, but we may be warned to go slowly, to reconsider, or to take special precautions. This help I believe particularly important in lesions of the upper abdomen. Chemical and microscopic examination of the urine, a leucocyte count, and a blood smear should nearly always be available.

Of these the urine sediment is most significant in diagnosis provided in women a catheter specimen is used; the leucocyte count, while not to be directly depended on, may tip the balance for or against an inflammatory process; and the blood smear may give evidence of lead poisoning or leukaemia. Not so readily available is determination of occult jaundice by estimating the color of the serum, which may point to biliary disease, or of delay in coagulation time showing a tendency to hemorrhage. Foresight in grouping patients and donors for transfusion may avert disaster.

The X-ray can be useful in many ways. In doubtful cases it may show a pneumonia, a subphrenic abscess, diaphragmatic hernia, or the distribution of gas in the bowel in intestinal obstruction. The gas bubble under the diaphragm in perforation of the gastrointestinal tract has already been referred to. In renal colic it may be used to show the calculus, but care must be taken not to depend too much on a shadow which may be entirely outside of the urinary tract. While the ingestion of barium is contraindicated in abdominal emergencies, there is ordinarily little harm in a barium enema, which may show colonic obstruction, diverticulitis, or an abnormal situation of the caecum and appendix.

These things, I admit, are of secondary importance. What is essential is sound clinical judgment, based on all available facts. In acquiring this judgment, it is not so much a matter of bulk of material, as of accurate observation and correlation of clinical experience. In upper abdominal disease it is best expressed in the selection of cases in which operation is either postponed or refused, for more complete study, for preoperative correction of dehydration or starvation, or on account of definite contraindications.

REFERENCE

- 1 Sir James Mackenzie: *Symptoms and Their Interpretation*. New York, P. B. Hoeber, 1920.

CHAIRMAN MIXTER: The third paper on the program this morning is "Traumatic Lesions of the Abdomen," by Dr. Kendall Emerson of Worcester.

TRAUMATIC LESIONS OF THE ABDOMEN

BY KENDALL EMERSON, M.D., F.A.C.S.

"THERE are patients brought into the hospital in whom we are called upon to differentiate between shock and active hemorrhage. Patients operated on while in shock nearly always die. In case of active hemorrhage the patients will die if not operated upon, so it is necessary to make a prompt and definite decision between these two conditions."

McGuire of Buffalo thus tersely sums up the problem presented by the traumatic abdomen.

On its proper solution depends success or failure in the treatment of this large class of surgical emergencies.

There are two distinct types of traumatic abdomen, one in which the belly wall is penetrated by a foreign body, the other in which the abdominal contents suffer from wholly external violence. In this brief paper penetrating wounds will not be considered. They have a peculiar interest through their recent prominence in war surgery, but the question of diagnosis in such cases is relatively simple as the presence of the wound is ordinarily an indication, as well as a guide, for operation and the repair of punctured wounds of the abdominal organs is carried out along familiar lines. It is appropriate, however, to allude to the very marvelous surgery that was accompanied in those cases of bullet or shrapnel wounds where a score or more of bowel punctures in a single individual were successfully sutured, where cases were saved that showed simultaneous wounds of several viscera, or combined injuries to the organs of the chest and abdomen with tearing of the diaphragm.

Considering only the traumatic abdomen resulting from external violence the causes may be comprehensively grouped under three types of injury, blows, falls and crushing accidents. The first two might well be combined as in the case of a blow some foreign missile is responsible, in case of a fall the victim is himself the missile, and results are similar. And indeed crushing injuries lead to no specific type of trauma save that there are more likely to be bony injuries as well and at times the exact location of the traumatizing force can be more accurately determined. Whatever form the accident may take there is a causal factor of no small importance in the state of the abdominal muscles at the time of injury. Lesions of the viscera are far more apt to occur in cases where the victim is taken unaware and has not sufficient warning to throw his abdominal muscles into a protective state of contraction. The force behind the straight arm jab of a Dempsey or a Tunney certainly has explosive power sufficient to rupture a spleen or a distended coil of bowel. The reason that such accidents are fortunately rare in boxing must lie in the preparedness of the recipient and the protection afforded by his tense abdominal wall. In the sudden industrial accident on the other hand unexpectedness is an important determining element in the severity of the result. For example, a man was struck in the belly by a flying plank while tending a circular saw and rendered unconscious, a rather classical cause of abdominal trauma. Later he stated that he had no recollection of the blow. There was no time for his protective reflexes to come into play. Likewise a seemingly moderate blow during sleep may have unexpectedly grave consequences. On the other hand one sees instances where a heavy cart or auto-

mobile has passed over an abdomen leaving the victim apparently little the worse for his experience. The weight was probably not too great for powerful abdominal muscles to support, when given due warning.

It would be an abuse of your patience to recount at any extended length the familiar symptoms of abdominal trauma. Cope gives an excellent generalization and in briefest form. "Pain, vomiting, local or general muscular rigidity, tenderness, alteration of pulse rate, shallow respiration, diminution of liver dullness, free fluid in the abdomen—these are the main symptoms to note. By taking into consideration the part of the abdomen struck, it is possible in most cases to say which viscus is injured and what is the nature of the injury." The symptom complex known as shock is the classical accompaniment of abdominal trauma, with or without rupture of viscera and with or without hemorrhage. The anxious facies, cold sweat, pallor, thready pulse and staccato breathing together with local signs and history of injury almost shout aloud the diagnosis.

But when the picture has duly aroused the conviction that one is dealing with a case of injury to an abdominal viscus nice judgment is required to differentiate the character and extent of the lesion and to decide whether or not operation is indicated and still further to decide on the patient's capacity to withstand operation. First of all an accurate answer must be sought to the question, "Just what has happened?"

The possible answers are numerous but they may be divided for discussion into the following groups:

1. Abdominal contusion without rupture of viscera or hemorrhage.
2. Rupture of a solid organ often with severe hemorrhage.
3. Rupture of a hollow viscus with escape of contents.
4. Injury to large blood vessels, often resulting from torn mesenteries.

Many points are mentioned by various authors as aids to differential diagnosis. None of them is entirely reliable. Shock may be assumed to be nearly universal and its symptoms are so nearly those of hemorrhage that the determination of the latter is greatly complicated. Both show similar objective signs with low blood pressure and subnormal temperature. In shock the leukocyte count is not altered while it is usually raised in case of hemorrhage or extravasation of visceral contents. In the latter conditions percussion should be a valuable aid but as a matter of fact percussing a traumatic belly in a suffering patient, especially if heavily built, does not always yield positive information. The lessening of liver dullness due to gas in the abdominal cavity is mentioned but in the few

cases where I have sought this sign I have not convinced myself of its value. In one instance to which I shall refer it was definitely misleading. Where an accurate history can be obtained the exact location of the trauma is suggestive and frequently muscle spasm may show a certain amount of localization and some point of greatest tenderness may be discoverable. Dr. William H. Rose has called my attention to a sign stressed by Sherman of the Homestead Steel Works who sees many cases of abdominal trauma. He states that agonizing pain without any remission suggests injury to mesenteric vessels. In theory this might be assumed to be the result of extreme stimulation of sympathetic ganglia due to the location of the lesion.

Vomiting is so frequent as to be of little diagnostic value although coffee ground vomitus would be taken to indicate stomach trauma. In a personal case of rupture of the liver, however, I observed what certainly appeared to be typical vomiting of this character while operation revealed the stomach intact peritoneally. Trauma was apparently sufficient to cause bleeding from the mucosa. In all cases the urine should be scrutinized carefully for blood but even if found we should not forget the possibility of injury to other organs as well as the trauma to kidney, ureter or bladder thus indicated.

To illustrate the uncertainties of diagnosis let me cite in outline the following case of ruptured liver. A boy of eighteen was run over by a slowly moving six-cylinder touring car. The front wheel passed diagonally across his left shoulder, left precordial region and right lobe of the liver. He was seen shortly by one of the experienced diagnosticians of the city who found the boy comfortable save for his bruised shoulder and possible fractured ribs. He showed no shock but on the contrary was rather alert and inclined to belittle the affair. He was not vomiting, color was good, pulse very little raised in rate and of good quality. The physician searched painstakingly for signs in both chest and abdomen of serious injury but without success, and after some time reluctantly allowed the boy to stay at home instead of sending him to a hospital for observation. Eight hours later when I was called the lad was in collapse, vomiting what appeared to be blood and showing the most intense abdominal pain and rigidity with some distension. Immediate operation disclosed a ruptured liver with enormous hemorrhage. Thanks to repeated transfusions and a good constitution the boy is well today, a sophomore at college and playing baseball. In other words shock may be delayed and hemorrhage slow in onset. All the typical symptoms appeared in due time in this case but the delay nearly proved fatal to the patient. It illustrates the paramount importance of having a case of possible abdominal injury under the most minute observation for a considerable period. This rule is exactly

as important in these injuries as in cases of concussion and should be axiomatic.

On delving into this rather fascinating subject of abdominal trauma my interest has been attracted along several paths. It is quite out of the question to exhaust all of these inquiries and lest I overtax your patience I will allude to only one problem, that of muscular rigidity which is so constantly present. What is its mechanism? If we knew the answer to this query would it help us in localizing lesions and estimating their severity? A case or two will help to state the problem. A soldier was brought in about five hours after he had been hit by a sand bag which had been hurled against his abdomen as the result of a shell explosion just outside of the parapet. He was in grave shock when he reached the Clearing Station and the whole belly exhibited extreme board-like rigidity at the same time being apparently greatly distended with gas. In this case there also seemed to be definite reduction of the liver dullness. He was given emergency treatment and responded to some extent, the pulse improving and diaphragmatic breathing returning in part, although the rigidity and distension persisted. Operation was decided upon in the definite belief that some organ had been ruptured, probably a hollow viscus with escape of gas. A quick search of the abdominal cavity failed to discover any such condition. There were a few scattered petechial hemorrhages under the peritoneum both of the bowel and of the parietes, but no bleeding and very slight increase of straw-colored peritoneal fluid. The operation did not consume more than fifteen minutes but unfortunately the man's condition grew rapidly worse and he died within a few hours. Autopsy revealed nothing that had not been found at operation. He died of traumatic shock, his demise probably hastened by operation.

Still another case will be reviewed briefly to illustrate the point that we may have all the necessary diagnostic signs without actual injury to viscera. A man received an oblique penetrating wound of the back in the upper lumbar region just to the left of the spine. He was in shock, the abdomen showed complete rigidity and was everywhere exquisitely painful. An X-ray showed a German bullet just to the left of the first lumbar vertebra, its point overlapping the bone slightly and apparently in a plane ventral to the body of the vertebra. On consultation all agreed that the bullet was probably in the abdominal cavity, that a viscus had been penetrated, a large vessel nicked or the kidney injured. There was no blood in the urine so an abdominal exploration was decided upon. The procedure revealed an absolutely normal peritoneal cavity and no sign of retroperitoneal bleeding. It was quickly concluded, the patient turned over and the bullet track explored. The missile was found embedded in the body of a

vertebra and was removed with no great difficulty, the patient making an excellent recovery. Dr. Benjamin H. Alton has given me permission to refer to a similar case of his. A woman in Lille was wounded during the evacuation of that city by the Germans in 1918. She was brought in with typical signs of abdominal trauma, her wounds consisting of multiple high explosive lesions of the lower back. Pictures showed fragments apparently intra-abdominal. Laparotomy was performed, a healthy peritoneum encountered and immediately sewed up, followed by removal of some of the high explosive fragments from the deep muscles of the back and the victim's satisfactory recovery.

Such experiences shake one's faith in signs for if there is an objective indication for surgical interference it certainly is the reflex muscle spasm so intimately associated in our minds with insult to the sensitive peritoneum. What, then, is the mechanism of this spasm of the voluntary muscles? Is it due to cyclonic disturbance of the sympathetic ganglia, the solar plexus screaming its protest; or is it due to a state of delirium in the somatic nerves which have been directly traumatized; or do both systems contribute their stimuli?

In his illuminating book, "Brain and Spinal Cord," Emil Villiger (page 218) states that "within recent years evidence has been brought forward showing that sympathetic fibers also run to voluntary muscle fibers. This may produce a double innervation of each voluntary muscle fiber (J. Boeke, '09, '13). Or according to John Hunter ('24) only a fraction of all the fibers of a voluntary muscle receive a sympathetic innervation. This is an important subject, which is still undecided." Is it possible that in the cases above cited injury to the somatic nerves themselves may set up a reflex muscle spasm by virtue of these putative sympathetic muscle fibers acting through the complicated system of collaterals to produce a result similar to that obtained by direct stimulation of the sympathetic ganglia?

The writer has appealed to several neurologists for enlightenment on these intricate questions of reflex paths and the exact mechanism whereby prolonged involuntary muscle spasm is maintained and after some discussion each has admitted that the subject requires much further study for its complete elucidation. From the point of view of the traumatic abdomen it is probable that the subject has academic rather than practical value as muscular rigidity will continue to hold its place among our most important guides in spite of its occasional ability to lead us astray as above illustrated.

No description of operations for the various types of trauma can be indulged in within the limits of this short paper. But the question of what to operate upon should be dealt with briefly. In undoubted rupture of a hollow vis-

cus, with escape of contents into the free abdomen there can be no question of the surgical emergency. In hemorrhage from a solid organ or from rupture of mesentery or injury to any large vessel the indication is also clear. Waiting for recovery from initial shock in such cases is dangerous. Likewise immediate operation. Without doubt transfusion now so freely practiced gives us our best chance to act promptly even in the presence of shock. Operation and transfusion may go on simultaneously and in some instances by using large quantities of blood from several donors patients' lives have been saved. Technical skill and the utmost speed compatible with safety are indispensable in the more serious cases.

While the kidney is extra-peritoneal it is still an abdominal organ and is frequently the seat of injury in abdominal trauma. Immediate operation is by no means indicated. The writer recently saw a case of renal hemorrhage in a young athlete who fell over a hurdle apparently striking his back across the top bar. A few hours later free blood with some clots was passed per urethra. The boy was kept quiet and while the blood did not disappear for several weeks no operation was deemed necessary and he is now back on the track. Dr. Truesdale's admirable paper in a recent number of the *BOSTON MEDICAL AND SURGICAL JOURNAL* presents a most thoughtful discussion of such injuries.

Rupture of the bladder is among the not uncommon results of abdominal trauma. It occurs rather more frequently in children perhaps because of the fact that the organ is more abnormally located in youth than in adult life. The distended bladder is of course more liable to injury than when collapsed. Extravasation of urine may take place intra-peritoneally or the leakage may occur into the surrounding cellular tissue. At times bloody urine may be passed or there may be suppression in case the escape is into the abdomen. It must be remembered that as in kidney trauma free hemorrhage may occur from contusion of the organ without actual rupture. Operation under such circumstances is not indicated and the cases do well under rest and expectant treatment. Where rupture is suspected cystoscopy has been suggested but as a rule a traumatized patient is not in the best condition for such procedure. A measured amount of boric solution may be introduced through a catheter and then withdrawn. If there is a marked discrepancy between the quantity injected and that recovered the suspicion of leakage is confirmed. Early operation is an urgent indication whether the tear has extended through the peritoneum or not since in either case the extravasated urine is an irritant and quickly leads to peritonitis or cellular inflammation.

Several series of cases of ruptured spleen have

been reported and the results of operation are very satisfactory. As a rule removal of the spleen is practiced but Senn and others have sutured small wounds with excellent recovery. There certainly would appear to be no contra-indication for this procedure in proper cases although an operator might feel more secure with the organ out and the vessels safely ligated. Rupture of the liver is a more serious lesion and hemorrhage may be uncontrollable even with operation. Deep sutures are at times effective, the cautery has been used with success and at times simple packing alone has resulted in the saving of lives. Such was the case in the patient reported earlier in this paper. The delay and uncertainty of suture was not deemed advisable and gauze packs controlled the bleeding sufficiently. A secondary operation is usually necessary in such cases for the resulting ventral hernia.

Rupture of the pancreas and of deep abdominal vessels, the latter often accompanying tearing of the mesentery, are extremely grave. In pancreatic injury there is nothing but drainage to be undertaken and the results are not gratifying. Extensive injury to mesenteric blood supply may menace the vitality of large sections of bowel.

Thus far we have discussed only the commoner results of abdominal trauma. There are other conditions such as hernia through the diaphragm, rupture of the muscles and aponeurosis of the belly wall itself, retroperitoneal hemorrhages often of considerable extent which are seen from time to time but which present no new surgical problems, although they require keen judgment in diagnosis. Dr. Alton reports a recent case of a boy run over by an automobile who was sent home from the hospital apparently without serious sequelae. Some weeks later his physician discovered an abdominal tumor. Laparotomy was performed and a retroperitoneal cyst discovered. The peritoneum was closed and the cyst opened, extra-peritoneally, and found to contain a large amount of nearly clear serum, evidently the result of hemorrhage with clot organized and serum encysted. The patient recovered satisfactorily.

A final point in differential diagnosis should be mentioned. At times typical signs of abdominal injury follow chest trauma. This is especially true in cases of haemothorax or haemopneumothorax arising from damage to the pleura, for example from fractured ribs. We have all seen cases of pneumonia in children where the signs were definitely those of peritonitis. I have personally removed a normal appendix in a child with early central pneumonia, fortunately with recovery of the patient, and I fancy some of you have had the same experience. Apparently in like manner serious damage to the chest may give rise to the very characteristic symptoms associated with an acute traumatic belly. Injury

to the chest should put us on our guard, but even here we must not forget that we may be dealing with lesions in both cavities.

It has escaped the writer's memory just what sturdy pioneer it was who laid down the surgical dictum, "When in doubt, operate." Such teaching is notably out of place in these hair-splitting diagnostic days. Yet there was always much common-sense in the bold dogmatism of our honored predecessors and this doctrine if ever justifiable would certainly seem to be so under the baffling conditions often presented by the traumatic abdomen. In these cases more lives will continue to be saved by prompt action than by time-consuming niceties of diagnosis.

CHAIRMAN MIXTER: Dr. Allen O. Whipple of New York has been good enough to come on to Boston to read us a paper on the subject of "Intestinal Obstruction." You are all familiar with Dr. Whipple's experimental work in intestinal obstruction, and the title of his paper is "Safety Factors in the Treatment of Acute Intestinal Obstruction."

DR. ALLEN O. WHIPPLE: I think I should preface my remarks by saying that I am given a great deal of credit for work in intestinal obstruction that is not mine at all—it belongs to Dr. George Whipple. I wish I could claim it.

SAFETY FACTORS IN THE TREATMENT OF ACUTE INTESTINAL OBSTRUCTION*

BY ALLEN O. WHIPPLE, M.D., F.A.C.S.

THE discussion of this topic is based upon the well established premise that the treatment of acute intestinal obstruction is essentially surgical. But inasmuch as the physician is usually the first to see the victim of this dread lesion and because early diagnosis is the chief factor of safety in its therapy, the responsibility for the result must be shared by the physician as well as the surgeon. Acute ileus is one of the acute abdominal lesions that is most dependent upon the immediate active coöperation of physician and surgeon.

The safety factors are logically grouped as those occurring in the preoperative, the operative and the postoperative periods of treatment, and will be so considered in this paper. But before discussing these factors I would remind you of some of the studies in the pathogenesis of acute ileus. The literature on this subject has grown astonishingly in the past ten or twelve years. I shall not attempt to review it but merely wish to point out certain landmarks. From 1912 to 1923 the attention of investigators was centered upon the study of the lethal factor in

high obstruction. This toxin, to use the vague term employed by most investigators, has been recovered in the contents of closed loops and has been considered by different experimenters to be a split protein, a bacterial product, a disintegration product of damaged mucosa, a histamin carrying compound. All are agreed that in obstructed strangulated gut a poisoning of the animal occurs and that the higher the lesion in the tract the more profound and rapid the intoxication. But with all the study given to this determination of the poison there is at present no agreement as to its exact nature.

Within the past two or three years, however, much valuable and constructive work has been done in clarifying the pathogenesis of obstruction and in explaining the rationale of therapeutic measures. Much of the disagreement among the experimenters has been due to the fact that they did not produce the same lesion, that is the conditions of the obstructed intestine and its production were not uniform. Hausler and Foster¹ of the University of Oregon have emphasized the importance of differentiating between simple obstruction and strangulated obstruction in evaluating the experimental data. This distinction between obturation and strangulation ileus has for many years been appreciated by the clinical surgeon. As a result of their experiments on dogs operated upon under local rather than general anesthesia Hausler and Foster have been able to approximate more closely the clinical picture. They conclude:

1. Intestinal obstruction as produced experimentally under local anesthesia in dogs closely resembles the human symptom complexes.
2. Experimental acute intestinal obstruction can be classed under two general headings, (1) acute simple obstruction and (2) acute strangulation.
3. The pathology of these two groups is distinctly separable and the lethal factors are different.
4. The symptom complexes of the two types are also very different. Acute simple obstruction shows relatively slight variation in temperature, pulse, respiration and blood pressure; while acute strangulation causes profound changes in these physiologic indicators.
5. Uncomplicated blood pressure observations on dogs following bowel obstruction, can be secured from the femoral artery under local anesthesia.
6. Ether and morphin must be eliminated in experimental studies of the acute symptomatology of intestinal obstruction.

I wish to emphasize the importance of the work of these investigators for they have correlated in a constructive manner the experimental with well known clinical observations. The fact that some thirty to forty per cent of acute ileus cases are at first merely simple obstructions but

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when neglected may go on to the graver strangulation ileus lesions is one of the greatest arguments for early diagnosis and early operation. This difference in the two types of ileus has also recently been demonstrated by Eisberg², and he proves the value of early therapy by his operative results.

into the tissues. They interpreted the prolongation of life in the obstructed animal by saline hypodermoclysis as the result of fluid replacement—a measure to combat dehydration. This therapeutic measure was used by experimenters and clinicians but its true value has only recently been explained by Gamble and

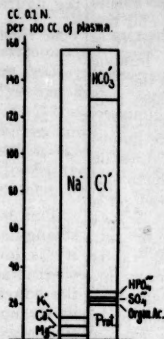


FIG. 1. REPRESENTING THE STRUCTURAL FACTORS OF NORMAL HUMAN BLOOD PLASMA IN TERMS OF ACID-BASE EQUIVALENCE AT PH 7.4
The factors are superimposed; those of base in the left hand, and those of acid in the right hand column.

FIGURE 1 (Taken from Gamble)

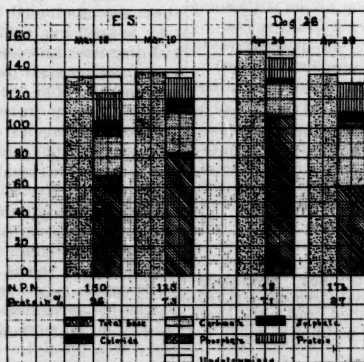


FIGURE 2

The second great contribution of the past two years has been in the physico-chemical studies of the body fluids, especially of the blood, in intestinal obstruction. This work is of fundamental importance in therapy before and after operation and promises great advances in the future. In 1912 Hartwell and Hoguet³ pointed out the value of physiological salt solution introduced

Ross⁴. Haden and Orr⁵ in their more recent publications have stated their belief that the lowered chloride is due not so much to vomiting as to the combining with the toxic body associated with obstruction. That is, they explain the benefit of normal salt solution introduced into the tissues as due to a protective rather than a reparative process. The conclusions of Haden

and Orr have been vigorously questioned by recent writers, and there seems to be a more definite and acceptable explanation as a result of Gamble's studies.

Following simple high obstruction there takes place in the vomited stomach contents a loss of Na' as well as Cl'. Continued vomiting depletes the tissues of these salts or electrolytes so essential to the normal structure of the blood and tissue fluids. By using Gamble's graphic picture of the acid-base structure of normal human blood plasma, Fig. 1, it may be seen that the Na' constitutes nearly all of the plasma base, and that Cl' is the chief electrolyte on the acid side. The acid base balance is preserved by the immediate and ready variation in the HCO_3' . Loss of Na' has no similar compensatory mechanism, and therefore involves an equivalent loss of acid, usually HCO_3' or Cl'. That is, loss of Cl' does not necessarily deplete the electrolyte or salt content of the plasma, whereas loss of Na' is much more significant. The compensatory increase in HCO_3' for loss of Cl' causes an alkalosis whereas loss of Na' is accompanied by a rapid dehydration. This dehydration cannot be adequately repaired by the introduction of water alone or of glucose solution because these fluids do not replace Na' and Cl' so essential to the normal osmotic relationship one is seeking to restore.

That there is associated with obstruction a definite progressive demolition of the sustaining structure of the blood and body fluids is demonstrated in the graph made from the electrolyte determinations in one of Dr. Atchley's obstructed dogs, 26, and shown in Fig. 2.

The change toward normal blood structure on administration of normal salt solution, by vein and by enterostomy, within a period of 24 hours is demonstrated in a patient, E. S., History No. 68289, recently operated upon for an ileus in our Clinic and studied by Dr. Atchley. This graph is shown on the left side of Fig. 2. The case history is appended.

In order to maintain the acid-base equilibrium of the blood when sodium and chloride are lost, the water content is diminished, and until these electrolytes are added water will not be taken up by the blood.

This point is emphasized because in the ante- and postoperative treatment of obstruction there is a tendency to give protoelyses of tap water and glucose infusions. We had been doing so in our clinic until our attention was called to the work of Gamble and by studies in our clinic by Atchley in experimental and clinical cases.

The increase in the nitrogen of the blood and the concentration of the Hgb. are indicators of dehydration and not necessarily of renal insufficiency.

PREOPERATIVE PERIOD

Early diagnosis is by far the most important safety factor in the treatment of acute obstruction. Statistics from all clinics in which studies have been made giving accurate data with regard to the duration of the lesion before operation prove this point. Tuttle⁶ gives the following figures:

Time from onset to operation	Cases	Death	Mortality, per cent.
Less than:			
6 hours	13	0	0.0
12 "	25	1	4.0
24 "	39	7	15.4
48 "	50	9	18.0
3 days	70	17	24.3
4 "	84	26	30.9
6 "	99	37	27.4

This is true both in obturation as well as in strangulation ileus. In the former the mortality is low and the results are brilliant if the obstruction is relieved early before the wall of the bowel becomes compromised by pressure or by strangulation, volvulus, or thrombosis. In the strangulation form early operation is the only hope of saving the patient, for once toxemia sets in the risk of any operative procedure is increased ten fold. Inasmuch as acute ileus is confused with other lesions giving an acute surgical abdomen, the only non-operative conditions that should be ruled out are coronary thrombosis, pneumonia and tabetic crises. If these are eliminated it is an unpardonable mistake to spend valuable time in making differential diagnoses between pancreatitis and the other acute abdominal lesions requiring operative treatment.

The points to be noted in the physical examination are scars of previous operations, especially drained abdominal incisions and irreducible hernia. In the absence of such findings the history and physical signs of an endocarditis should suggest a mesenteric embolus, the presence of arteriosclerosis or syphilitic endarteritis indicate a possible accident to the mesenteric vessels. The spasm of arteriosclerotic mesenteric vessels may simulate an ileus, and because of the bad prognosis with operation it may be wise to do no more than a jejunostomy in these cases if a paralytic ileus is present.

In the individuals with history and signs of a carcinoma of the colon a chronic ileus may rapidly change to an acute obstruction. A cecostomy under local anesthesia should not be delayed in these cases where a barium enema shows obstruction in the colon. Cecostomy serves as an immediate safety valve and prepares the patient for the second stage of removal of the growth. The writer feels that a cecostomy should precede a partial colectomy even when acute obstruction is not present. In the chronic ileus cases a sudden obstipation with or without pain, and a beginning distention should be rea-

son enough to explore the patient, before vomiting with its associated dehydration, hypochloremia and marked distention add to the risk and difficulty of the operation.

Further factors of safety to be insured the patient as preoperative measures are lavage, removal of blood for chemical study followed by infusion or hypodermoclysis of physiological salt solution, avoidance of catharsis and the withholding of fluids or food by mouth. Because of the disturbed structure of the blood plasma and tissue fluids as shown by Gamble and Atehley normal salt solution is essential. If glucose is used in the clyses or the infusions it should always be made up with normal salt solution and not distilled water. Glucose made up in this way had best be reserved for the postoperative period, and its administration determined by blood chemistry findings.

OPERATIVE PERIOD

There are several valuable principles in the actual operation that may determine the success or failure of the operation. It is always advisable to use a mid-line incision, unless the mid-line has been the site of a previous incision. Exploring for obstruction is always easier through scar-free peritoneum. The character of the fluid on opening the peritoneum is of great prognostic value. If no fluid is present the lesion is not advanced, if clear odorless fluid is found it may be due to early peritoneal effusion or presence of a new growth. Serosanguinous fluid usually means vascular impairment of a loop of gut. Sanguinous dark colored fluid means dead gut or pancreatitis, but fat necrosis usually accompanies the dark fluid of pancreatitis. Foul blood fluid means peritonitis, and fibrino purulent adhesions will usually be found over it in the region of the gangrenous bowel. Sanguinous or sanguino purulent fluid is a warning signal to reduce the time of the operative procedure to the minimum.

The next valuable indicator is the finding of collapsed gut. Locate the junction of distended and collapsed gut as rapidly as possible. If a distended cecum and empty sigmoid is found and no gangrenous colon is seen the indication is to do a cecostomy to allow the escape of gas and fluid feces.

If the distention of small bowel and colon is marked, the obstruction is probably below the splenic flexure. A perforated aspirator attached to a long rubber tube introduced into the cecum or markedly distended small intestine may be necessary in order to reduce the distention, facilitate the exploration and make possible the closure of the abdomen. It is much wiser to do this early in the operation than to shock the patient with a prolonged difficult struggle to replace distended loops and because of the patient's condition to locate the obstruction.

The use of a high ileostomy or a jejunostomy as a factor of safety is a debated one. In our experience in cases with marked distention of small intestine, with fecal vomiting it is a safety factor and we are coming to use it more and more in both dynamic and in paralytic ileus with peritonitis.

Van Beuren and Smith⁹ have recently made a study in the Presbyterian Hospital Clinic of enterostomy cases, to be published in the near future. They divided the cases into two groups, those in the period from 1920-23 showing a 63% increase in the number of cases in which enterostomy was used as compared to the period from 1916-19. In the 1920-23 series there were more cases forty-eight hours after onset of ileus than in the previous series. Nevertheless, the mortality was reduced 13.2%.

An improperly placed jejunostomy or the use of too large a tube or the suturing of jejunum to anterior abdominal wall has given bad results, but we believe that a No. 16 F. catheter with several perforations in the distal 2 cm. inverted with two purse-string sutures or by the Witzel method to provide a valve on its removal, with jejunum free in the abdomen, has the following advantages. 1. It permits of the escape of gas and upper intestinal contents. 2. It prevents the fecal vomiting following operation. 3. It makes possible lavages of the upper jejunum with saline. 4. It permits of early introduction of saline and peptonized milk when there is a tendency to dilated stomach. The use of a Paul's tube for jejunostomy is mentioned only to condemn it. In my own experience I have done a jejunostomy under local anesthesia as a preliminary measure to exploring for the site of obstruction and have found that the distention and vomiting was so relieved within a few hours as to make the exploration an easy and successful procedure. It is my impression that jejunostomy and cecostomy are not used sufficiently as preliminary measures to the major procedures in acute and chronic cases. During the past three years I have been making a jejunostomy in my gastric resections for both ulcer and carcinoma using the jejunostomy for immediate feeding purposes, thus putting the stomach at complete rest for three to five days. There are cases so far advanced in the toxemia and shock of strangulation ileus that the added time and manipulation of a resection, as in a volvulus, will prove too great a tax on the rapidly diminishing margin of the patient's resistance. In these patients the strangulated segment had best be delivered into the wound, clamp applied to the proximal and distal ends and to the mesentery, with suture of the abdominal incision and later removal of the gangrenous loop. To these should be added a jejunostomy under local. A gangrenous loop should never be left as a drained or undrained loop in the peritoneum.

POSTOPERATIVE PERIOD

Immediate treatment of the patient for shock by external heat and transfusion is essential in many of the strangulation ileus cases after operation. Gastric lavage unless a jejunostomy is done is essential and should be repeated if there is any evidence of recurring vomiting. Jejunal lavage with saline solution through the jejunal tube and drainage of the jejunal loop into a measuring bottle will reduce and in many cases entirely eliminate postoperative vomiting. The recent work of Portis and Portis¹⁰ has shown the remarkable effect of washing out of closed duodenal loops, and gives experimental proof of the advantages of irrigating the dilated upper jejunum. In the advanced cases, because of the vasomotor collapse with leaky skin, the vomiting and inability to take water by mouth, it is of the greatest importance to restore the fluid balance. As has been shown by Gamble and in our cases by Atchley, the one efficient way to do this is by the introduction into the tissues or vein of sterile normal salt solution. As shown by a recent clinical case it is the immediate restoration of the fluid loss that is the significant factor in the improvement rather than the restoration of the blood chloride level. The introduction of salt solution by elysis and by jejunostomy gave the striking improvement in the clinical as well as the blood chemistry picture. The restoration of the kidney function is of course a corollary.

The study of the blood chemistry to show the acid base relations and the red cell and haemoglobin in concentration is the best means of gauging the tissue fluid balance, and for this reason daily blood chemistry studies should be made until normal figures are obtained.

For the reduction and prevention of distention, hot applications to the abdomen and colonic lavage have long been recognized. We find large flaxseed poultices and double or single tube colonic irrigation with pituitrin every six to twelve hours for the first two days takes care of the distention.

To sum up: Early diagnosis, early operation with the minimum time and trauma, the use of jejunostomy in the advanced cases or in the cases with high obstruction, pre- and postoperative use of normal salt solution rather than glucose or water, and careful blood chemistry determination, these are considered by us at the Presbyterian Clinic as the chief factors of safety in the treatment of acute intestinal obstruction.

E. S. Hist. No. 68289.

Admission, March 17, 1927.

First admission of a white adult widowed American laundress, 57 years old, who came into the Accident Ward complaining of abdominal pain for five days.

Personal, Past and Family history not essential.

Five days before admission she was suddenly seized with cramp-like pain about the umbilicus soon becoming generalized. Two hours later she vomited breakfast. She went to bed and remained there until

admission, vomiting quite severely every day—vomit brown, foul, no blood. Ate nothing during that time. Bowels did not move. Some gas p.r., much p.o. Enemas gave poor results but a little fecal material. Pain persisted, severe, cramp-like, generalized. Four weeks before admission a similar attack with vomiting lasting about eight hours. She had had a cold for about two weeks without sputum. No respiratory or urinary symptoms.

Physical Examination: Temp. 99.4. Pulse 96. Resp. 24. Blood pressure 140/78. W. B. C. 27,000. Polys 90%. Urine: Occasional W. B. C. and R. B. C. Alb. v. f. t.

Acutely and chronically ill elderly woman drowsy but coöperative and oriented. Skin cool, moist, clear. Calvarium negative. Left cornea showed large opacity. Heart and lungs negative. Abdomen rounded, full in flanks, not moving with respiration; no peristalsis. Slight right-sided tenderness. Mass which was slightly tender; dullness in both flanks and above pubis. Elsewhere tympanitic. No fluid wave. Extremities showed varicose veins. Rectal—Rectum coated with fecal material but empty.

Operation: It was thought she might have a neoplasm at the hepatic flexure and so a right-sided incision was made, but obstruction found to be due to strangulated knuckle of intestine due to Richter's type of left direct inguinal hernia. This was easily reduced, but apparently in fair shape, moderate increase in amount of peritoneal fluid. Enterostomy was done and wound Dakinized with catheter.

Course: Improvement followed immediately—no more vomiting. Next day saline given as blood chlorides found to be low (4.0 G/L) and total acids much decreased, blood urea high (2.16 G/L); CO₂ about normal (62.8%). Day following, blood figures much improved and three days later almost back to normal. Enterostomy tube out fifth day postoperation, without untoward effects. Blood pressure remained well up. 3/22 W. B. C.

Discharged: April 8, 1927.

Seen in follow-up two months after operation. She was feeling better than at any time previous to operation. Physical examination showed a well-healed scar.

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CHAIRMAN MIXER: The next paper on the program takes up the medical aspects of the acute surgical abdomen, by Dr. Reginald Fitz of Boston.

THE MEDICAL MAN'S PART IN THE MANAGEMENT OF ACUTE ABDOMINAL LESIONS

BY REGINALD FITZ, M.D.†

INTRODUCTION

THE average medical man necessarily comes in close contact with surgery and should con-

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sider himself one of the well defined units of a surgical team. He constantly carries surgical responsibilities on his shoulders. His method of procedure in the management of "The Acute Surgical Abdomen" is a matter of importance and practical interest.

THE MEDICAL MAN AS A SURGICAL DIAGNOSTICIAN

The majority of acute surgical illnesses, with the possible exception of traumatic lesions, are first seen by the medical man. He is the first to decide whether a given case has any surgical aspect and whether a surgical consultation is necessary; his fingers are the first to feel of the abdomen, his eyes the first to note the patient's appearance and reactions, his opinion the first to determine whether or not any delay in operative treatment is permissible. Therefore, the medical man must strive to develop in himself to as high a degree as possible, that indescribable quality known as good surgical judgment and must endeavor to make the same quick, accurate, almost uncanny diagnoses that the surgeon does. This is an important point. Too often the medical man is guilty of procrastination in the treatment of the acute surgical abdomen. There are too many cases where the medical man's surgical judgment is fallacious, where he overlooks an acute surgical emergency and where he calls in the surgeon too late to prevent an unnecessary fatality. The first duty of the medical man in the treatment of the acute surgical abdomen, therefore, is that of a diagnostician. He must recognize the condition at once and send for surgical help.

THE MEDICAL MAN AS A SURGICAL ASSISTANT

The medical man should keep abreast of the advances in surgical knowledge and take pride in cultivating a surgical view-point. When the medical man has seen a case with a suspected acute abdominal lesion and has called a surgeon, he becomes, automatically, part of the surgical team. He should use surgical foresight and try to assist the surgeon as conscientiously and intelligently as possible. A good medical assistant to a surgeon has almost as responsible a part in the successful management of the acute surgical abdomen as does a good surgical assistant, operating nurse or anesthetist.

The surgeon will demand a complete history and physical examination in each case as he will be compelled to make, almost at a glance, important, even life-saving decisions in regard to treatment. Hence the facts of the case must be presented to him by the medical man first seeing the patient, as carefully and logically as is possible under the circumstances.

There are certain well known diagnostic pitfalls which are worth while for the history-taker to bear in mind. Lobar pneumonia, especially in children, is notorious for occasionally begin-

ning with symptoms suggestive of appendicitis. Pneumonia, however, is more likely to begin with a chill and high fever and to cause dyspnoea and pain in the chest on deep breathing, while appendicitis commences more slowly, usually does not produce an extremely high fever or chill, and is not complicated by dyspnoea or cough. Pyelitis or renal calculus also may be confused with appendicitis.

During an influenza epidemic there will be many cases with acute abdominal symptoms.

Coronary thrombosis is easily confused with biliary colic. Coronary thrombosis occurs more frequently in men than women and is not complicated by jaundice. A careful history often shows that the patient, in the past, is known to have had hypertension and has complained of moderate dyspnoea on exertion for some time, or of more or less transitory attacks of pain referred to the precordium or to one or both arms, developing after exertion or sudden emotion and passing off immediately with rest. Biliary colic is more common in women, usually gives an antecedent history of chronic indigestion with especial difficulty in digesting fatty or greasy foods and such foods as raw apples or onions. There may have been a previous typhoid infection or repeated pregnancies. The onset of the colic is violent, and pain in the epigastrium, rather than a sense of oppression, is the chief symptom. The pain may be referred to the region of the right shoulder blade, the back, mid-epigastrium, chest or even left upper quadrant. Transitory jaundice is frequent.

Cases of acute pancreatitis and of acute intestinal obstruction may give almost identical histories. While the character of the pain at the onset may be much the same in each instance and of a sharp, griping, intermittent character, the obstructed case passes nothing by rectum after the lower bowel is emptied, while the pancreatitis case may have all the ear marks of acute intestinal obstruction—without, however, obstruction.

Diabetic coma occasionally develops out of an apparently clear sky and with symptoms of acute abdominal pain, nausea and vomiting. The type of breathing with associated air-hunger is usually characteristic, and if one has a keen nose, the odor of acetone on the breath may be well marked. Moreover, a careful history usually brings out the fact of antecedent polyuria, polydipsia and polyphagia.

Occasionally cases of cancer of the intestinal tract do not seek medical advice until acute obstruction, perforation or hemorrhage occurs. It is a good rule to suspect cancer as a possible cause of any acute abdominal condition in a person past middle life. An antecedent history of previous loss of weight, ill-defined gastro-intestinal symptoms, especially if accompanied by any suggestion of intermittent diarrhoea and constipation, should receive due consideration.

In brief, in many cases of "acute surgical abdomen" the accurate diagnosis of the underlying pathology can only be obtained by a subtle analysis of the patient's symptoms. One must constantly be wary of the unexpected and must obtain a comprehensive history.

A complete physical examination must also be made. It is well to follow an orderly sequence in physical examination and to remember that the presenting symptom of abdominal pain may be secondary to disease in some other part of the body. There are certain minor points in physical diagnosis which are worth remembering.

Jaundice is invisible in artificial light.

An Argyll-Robertson pupil is usually overlooked unless the pupillary reflexes are carefully examined; if abnormal pupillary reflexes are noted, the arm, knee and ankle jerks should be carefully examined as the gastric crises of tabes may simulate the acute surgical abdomen.

Lead colic may produce a clinical picture which strongly suggests an acute surgical emergency. A patient suffering from lead poisoning usually has a lead line along the dental margin of the gums. On the other hand acute appendicitis, for example, may occur in a patient with a lead line but with no symptoms of lead poisoning.

Enlarged lymph nodes in the supra-clavicular fossae or just below the umbilicus always suggest malignant metastases. An enlarged hard discrete node above the left clavicle is suggestive of cancer of the stomach, while one above the right clavicle is more apt to be secondary to a neoplasm in the mediastinum, lung or bronchus.

The character of the heart sounds may be fairly characteristic in coronary thrombosis. There is usually a gallop rhythm at the apex, with sounds of poor quality, and distant in proportion to the force of the apex impulse, there may be a pericardial rub heard along the sternal margin which if present is very positive evidence of a cardiac rather than abdominal accident, and the blood pressure is always low.

The blood pressure is low in shock or following hemorrhage and there is a resultant low pulse pressure. A well sustained systolic pressure with a high pulse pressure means that the patient is in better condition than if both systolic and pulse pressures are low.

The more important lung signs are usually best made out in the back rather than in the front of the chest. Most of us are in the habit of examining chests when the patient is sitting upright rather than when he is lying flat. It is so important to examine each patient's chest thoroughly, that in the case of one with a suspected acute abdominal lesion, he should be rolled first on one side and then on the other before the examination is completed, and if there is doubt about the findings he should be gently raised to a semi-upright position so that a satisfactory examination of the back can be com-

pleted. Dulness with diminution of the voice and breath sounds occurs frequently over the right back when the liver is displaced upward and does not necessarily point to hydrothorax or a consolidated right lower lobe. Inspection, palpation, percussion and auscultation of the chest are all important, and no examination of the chest is complete without the careful carrying out of these examinations.

Sir William Osler once said that doctors do not use their eyes enough in abdominal examinations. Visible peristalsis or the appearance of a hernia or tumor may be significant diagnostic aids. The feel of the abdomen is apt to be of greatest importance however, and the man who first palpates the abdomen has all the chances in his favor. He may feel a tumor mass later to be obscured by muscular spasm or distention, or detect localized areas of tenderness which soon become unrecognizable.

Percussion of the abdomen is of definite value. Unquestionable shifting dullness points to the presence of free fluid in the abdominal cavity, though such fluid has to be in considerable quantity to be perceptible. When the liver or spleen is ruptured, there may be localized dullness due to hemorrhage which does not shift with change in position. In perforating lesions of the intestines where there is free air in the peritoneal cavity, the liver dullness may become quickly obliterated. One can get confused by a large amount of gas in the transverse colon, but in the absence of such distention, diminished or absent liver dullness is an important sign.

Auscultation of the abdomen is also a valuable procedure. Peristalsis can usually be heard more easily than it can be seen, and it is important to discover whether or not peristalsis is entirely absent or whether audible peristalsis is sharply localized or exaggerated around a definite area.

The pelvis must always be examined. A rectal or vaginal examination may tell the whole story, and inflammatory masses or various tumors which are overlooked by abdominal examination alone may be easily palpated by the bimanual method.

THE LABORATORY AS AN AID TO THE SURGEON

While as a rule there may be too little time for any but the simplest laboratory work in the diagnosis of acute abdominal emergencies, yet the laboratory has a definite part in helping solve certain of the various problems which may be encountered. The well organized hospitals which are scattered all over the country-side have well equipped laboratories which can quickly put through emergency work of various kinds so that there is little excuse for neglecting this phase of the subject.

While waiting for the surgeon to arrive, and after the history and physical examination is made, the medical man should collect in suitable

containers whatever laboratory specimens seem essential and send them at once to the nearest laboratory. The laboratory studies should include as a routine, a blood count and urinalysis. Other tests may be indicated such as a stool examination, perhaps a blood grouping for possible transfusion, a determination of the bile pigment concentration or coagulation time if jaundice is present, or a determination of the blood nitrogen concentration, the blood sugar, bicarbonate or chloride level.

The white count is elevated with a relative increase in neutrophilic cells soon after the onset of almost any acute inflammatory lesion of the abdomen, tending to become more elevated as the inflammation spreads. The initial white count is usually higher in lobar pneumonia than in acute appendicitis. An elevated white count is commonly found in coronary thrombosis or diabetic coma, as well as in acute appendicitis or cholecystitis, while a low white count is apt to be found in typhoid fever, in the early stages of intestinal obstruction, or in influenza with abdominal symptoms. Rapid loss of blood is not immediately followed by a lowered red count. The first effect of loss of blood is to reduce the blood volume as a whole; it is only when the blood has become diluted by fluid absorbed from the tissues that the dilution effect of hemorrhage is noted and that the red count becomes diminished.

Albuminuria occurs frequently with almost any sort of an acute surgical lesion and there may frequently appear in the sediment a few hyaline or granular casts, leucocytes, or red cells, so that these findings do not necessarily point to a diseased kidney. The presence of much blood or pus in the urine, however, points to a renal lesion rather than to one involving the peritoneal cavity. Total anuria is always significant. If the patient is unable to empty his bladder spontaneously, he should be catheterized with a soft rubber catheter.

The presence of sugar or bile in the urine demands comment. Occasionally transitory glycosuria may develop from acute lesions in the upper half of the abdomen. A significantly large amount of sugar, however, especially when accompanied by albuminuria, casts, and a strongly positive diacetic acid reaction almost invariably denotes diabetes. The presence of bile in the urine signifies obstructive jaundice; its presence may help to clear up the diagnosis.

A specimen of stool can usually be obtained by enema or even by scraping out the lower bowel with the examining finger. The presence of blood or pus in the feces or the passage of slimy mucus is noteworthy.

The transitory glycosuria which may develop with acute upper abdominal lesions is usually not accompanied by a very high blood sugar level. Diabetic coma on the other hand tends to produce remarkably high blood sugar readings.

Blood urea or non-protein nitrogen determina-

tions are worth having from their prognostic value, for the greater the accumulation of the blood nitrogen, the poorer the prognosis is and the worse the operative risk. This is particularly true in high intestinal obstruction cases or in lesions of the kidneys producing total or partial anuria. Prolonged vomiting and dehydration often produce a state of alkalosis with high blood bicarbonate concentration and low plasma chlorides. It may be important to know these values as guides to methods of pre-operative preparation.

I have mentioned these various points because I think that many doctors are not sufficiently impressed with the practical importance of the laboratory as a help to surgical diagnosis and treatment, and do not realize that the various analyses can be carried out very quickly. A complete blood count, urinalysis, stool examination, blood sugar, chloride, nitrogen and CO₂ determination can be completed within an hour's time by two laboratory technicians working together. The specimens can be collected in a few minutes, sent at once to the laboratory by any volunteer carrier, and the reports can be telephoned back as soon as they are ready. Admitting therefore that it might take the surgeon an hour to complete his examination after he was first called, he could probably have in his hands whatever laboratory data he might need as soon as he was ready for them. The more carefully his cases are worked up, the less haphazard will be his diagnosis and the more satisfactory will be the end-result of his treatment.

THE MEDICAL MAN'S TREATMENT OF "THE ACUTE SURGICAL ABDOMEN"

Diagnosis is the most important part of the medical man's work in the management of acute abdominal conditions. His responsibilities do not end here, however, but he must use surgical foresight by immediately instituting proper pre-operative treatment.

The medical man should follow carefully the clinical condition of the patient without unnecessarily disturbing him. Rectal temperatures should be recorded at hourly or two hourly intervals and the patient should be kept warm. The pulse and respiration rate should be charted. If the patient is in shock, frequent blood pressure determinations should be obtained and treatment to combat shock should be instituted. In the absence of a mass palpable by rectum, a soap suds enema should be given to clean out the lower bowel, and tap water infusion by the drop method should be started. Cathartics should not be prescribed. It is a safe rule, also, to forbid the patient to eat or drink anything. If the patient is vomiting frequently and if there is no marked local epigastric tenderness and no fresh blood in the vomitus the stomach should be washed. If there is much obvious dehydration, 1000 cc of normal saline solution should

be injected under the pectoral muscles. In brief, pending the arrival of the surgeon, the medical man should do everything within reason to keep the patient comfortable, and to prepare him for possible operation: above all he should avoid doing harm.

THE MEDICAL MAN AS A SURGICAL CONSULTANT

The chief responsibility for treatment of "the acute surgical abdomen" rests finally on the surgeon's shoulders. The medical man should help to carry the load of this responsibility as much as possible. He should be able to give the surgeon a reasonably sound opinion in regard to diagnosis in each case, the results of a careful physical examination, and a well considered opinion in regard to treatment based upon the results of a careful clinical study. I do not mean to suggest that the surgeon will not want to elaborate upon the history presented to him by the medical man nor neglect to make his own physical examination. I believe, however, that the medical man seeing the case first, should be able to discuss intelligently with the surgeon who sees the case later, the particular problem presented in diagnosis, should know enough about surgery to have a definite opinion in regard to the most suitable form of treatment, and should be sufficiently familiar with surgical hazards to give a shrewd prognosis. The medical man and surgeon should work together, for in this way, the patient and his family gain the benefit of a concerted rather than individual opinion under very trying and anxious circumstances. They realize that this opinion is not arrived at impulsively but after due deliberation, they usually follow out the prescribed treatment without friction, and in the case of an unhappy end result the relatives of the patient feel that everything possible has been done for the sick man and that no mistakes were made through carelessness or immature judgment.

CONCLUSION

On the whole, the medical man's part in the management of "the acute surgical abdomen" is not an unimportant one. Since he, rather than the surgeon, first sees the majority of acute abdominal emergencies, his prime duty is that of a diagnostician. He must recognize "the acute surgical abdomen" at once and send for surgical help.

The medical man should take pride in being a good surgical assistant, for when he has seen a case with a suspected surgical lesion and has asked for a surgical opinion, he becomes automatically part of the surgical team. He should assemble the case history for the surgeon as carefully and logically as is possible, make a complete physical examination, and initiate such laboratory work as promises to be of practical value. In this way he may save time for the surgeon and the factor of time is always important.

The medical man's treatment of "the acute surgical abdomen" is largely expectant. Pending the arrival of the surgeon, he should do everything within reason to keep the patient comfortable, and to prepare him for possible operation. He should avoid doing harm at all costs.

While the chief responsibility for the successful management of "the acute surgical abdomen" rests upon the surgeon's shoulders, the medical man should not fear to share this responsibility. Seeing the case first, he should be able to discuss intelligently with the surgeon who sees the case later, the particular problem presented in diagnosis, prognosis and treatment. The surgeon and medical man should work together in managing cases of "acute surgical abdomen" for the more accurate is the diagnosis of the cause of these cases, and the better considered their method of treatment, the less uncertain will be their end results.

CHAIRMAN MIXTER: To round out this group of papers and to coordinate our views, Dr. John H. Gibbon of Philadelphia has come to complete the program. I am sure Dr. Gibbon needs no introduction.

THE SO-CALLED ABDOMINAL EMERGENCIES

BY JOHN H. GIBBON, M.D.

I HAVE been asked to present a résumé of the excellent papers to which you have just listened, but was also told by your capable secretary that the résumé must be written and handed in at the time of presentation and I was therefore in the position of having to prepare a discussion of papers which I had not heard; not an easy task. It seemed to me therefore that an issue out of my difficulty would be to say something in a general way about abdominal "emergencies" and then to present something of a practical nature in regard to some of the subjects which have been presented. Much, therefore, of what I say will necessarily be a repetition of what is already well known to those of you who are surgeons. But if it is true and generally accepted by surgeons it is worth repeating.

The acute lesions of the abdomen and others which closely resemble them, such as have been so well presented by the previous speakers are too often termed "emergencies" and rushed to the operating room without adequate examination or preparation. Excepting severe hemorrhage and obstruction of the respiratory tract, there are few conditions which demand or warrant such immediate surgical intervention, without taking the time necessary for a thorough examination and a conscientious attempt at a diagnosis. A "snap diagnosis" is often very brilliant and appeals to our sporting natures,

but it should be fortified or disproved by a careful study of the patient's history and symptoms.

The inimitable DaCosta says: "An intuitive diagnosis is a rapid method of reaching a wrong conclusion." The majority of mistakes which we surgeons make are in the so-called emergency cases and these are made not because we do not know the difference in the symptoms of the various lesions, but largely because we settle at once on a diagnosis or allow a supposed urgency to be a warrant for an ill-advised or improper operation. The "rush" of the patient to the operating table is too like the rush of a hospital ambulance through the streets, without reason and an unnecessary menace to the patient in the one case as it is to both patient and pedestrian in the other. This speed too sometimes suggests to the knowing onlooker the idea that it is in part due to the fear that "if we don't do it now someone else will do it later." A little time given to the examination of the patient and the proper preparation for the operation forestalls such an assumption and often is the means of avoiding a surgical error. Another reason why the "emergency" needs a little thought and consideration is because so often the work is to be done by the inexperienced operator and yet in no field probably do experience and judgment count for so much as in the acute lesions of the abdomen. The young man starting his surgical career, and it is to him that these cases usually fall, needs particularly to study his urgent cases, attempt a diagnosis and be very sure that they are emergencies before treating them as such.

It is very easy to fall into the habit of "exploring" or "opening to see," but it requires some effort to develop the habit of studying our patients carefully, of weighing symptoms and giving them their relative value, and of taking into consideration the contraindications as well as the indications for operation. The easily acquired habit renders one a poor internist or surgeon, with little likelihood of further development, while the other makes him a man whose opinion carries weight and who with experience is apt to progress in knowledge. The making of a diagnosis is as important to the surgeon as to an internist. If a surgeon is content to operate on the diagnosis of someone else, to make no attempt to study the patient's symptoms, to call to his aid none of the laboratory facilities for diagnosis and to do nothing to determine his patient's general state of health, but rather depends on a "snap diagnosis," he becomes at once a menace, however facile he may be with his hands. Operative skill is more easily acquired than surgical judgment and diagnostic ability.

One of the best indications of our surgical progress is the number of papers which have in recent years appeared dealing largely with the diagnosis of acute surgical lesions.

Formerly it was the importance of prompt intervention that was emphasized. A recent

very excellent paper on "The Diagnosis of Abdominal Emergencies" by Dr. John M. Birnie appeared in the *BOSTON MEDICAL AND SURGICAL JOURNAL* (April 21, 1927).

I think we all, both internists and surgeons, agree on the question of the treatment of these acute lesions but the importance of their recognition and differentiation still needs reiteration. Fortunately the history and symptoms of nearly all the acute lesions of the abdomen are typical and if one knows these and looks for them he is not apt to make a mistake. For instance, there is no need to confuse a perforation of a duodenal ulcer or the appendix with gall bladder or renal colic, in the one case the board-like rigidity of the abdominal muscles and the quiet condition of the patient compared with the soft abdomen and the restlessness and activity of the patient in the other is almost enough to differentiate the two conditions. And everyone is familiar with the typical history of a ruptured extra uterine pregnancy.

The history of his symptoms and the character of his pain as given by the patient becomes the most important thing in making a diagnosis of acute abdominal lesions and deserves to be given the most careful consideration. Too often this history and description is not the patient's but a misleading lot of statements suggested by the one who writes them. "Let the witness tell his own story," should be the rule in medicine as in law. Guide, but do not lead him. Too often the patient has difficulty in describing his symptoms and is glad to get the matter over with by agreeing to any suggestions made to him.

Next in importance to history is the physical examination and here I hope I may be forgiven if I lay stress on the manner in which this should be made. In nearly all the cases we are considering the patient has either a great deal of abdominal pain or tenderness and is very apprehensive of having them increased by the examiner and only too often his fears are well founded. The thing we should first avoid in examining the abdomen is giving rise to pain. To begin by poking about the suspected area with the ends of the fingers is one of the best means I know of learning nothing by your examination.

The first thing you want to know is whether there is muscular rigidity and its limitations; if you hurt the patient at the start you will find it always and everywhere. Gentle palpation with the fingers extended beginning in the least suspected area and gradually approaching the part complained of or suspected will not cause rigidity or pain and will give you the important information you want. Nothing is more provoking than to have some one else demonstrate the rigidity or tenderness in a case of appendicitis by a stiff "jab" of the forefinger in the lower right quadrant. When this is done you had best postpone your own examination of the abdomen until the patient has recovered from

his pain and fear and then begin by quietly palpating the upper *left* quadrant. In acute lesions of the lower abdomen in males, children and unmarried women, rectal examination often gives as much information as abdominal palpation and sometimes, as in a pelvic appendix, information which can be gained in no other way. When symptoms indicate an acute appendicitis and abdominal rigidity and tenderness are absent on light pressure, the examination is not complete without palpation through the rectum. And here again I would urge gentleness and the gradual introduction of the finger, otherwise pain is produced and the examination may be unsatisfactory. An inflamed retrocolic appendix produces typical rigidity and tenderness in the loin.

I have indicated that history and physical examination will give us the best clues to the diagnosis of acute abdominal lesions and so they do, but I am not one of those who believe we can discard certain laboratory examinations even in these urgent cases. Too often has a urine examination revealed a pyelitis in a child or woman who was supposed to have an acute appendicitis. A leukocyte count or, better, a complete blood count, is often the means of deciding a diagnosis and the time required for making them is not time lost. An eosinophilia has twice enabled me to make a diagnosis of hydatid cyst where without it the operation would have been in the nature of an exploration for an obscure abdominal tumor or infection.

I would not have you think that what I have said indicates that I approve of unnecessary delay in operating upon acute abdominal cases, but I would like to emphasize the fact that what I have suggested in the way of study and examination are essential to successful surgery in these cases and the time taken to make them is a benefit rather than a detriment to the patient, and moreover, a great help in the development of diagnostic skill and surgical judgment. A not infrequent error is that of trying to make a diagnosis of a comparatively rare lesion while we overlook the common one. Twice I have seen a diagnosis of acute pancreatitis made by distinguished internists quickly demolished by a just consideration given to the patient's history and description of the pain; the correct diagnosis confirmed by prompt operation was gall stones in one case and a strangulated femoral hernia in the other.

Even in the traumatic cases the history is of important diagnostic value. I have always remembered Homer Gage's excellent paper on "Traumatic Perforations of the Intestine" and whenever I am given a history of a blow received in the upper abdomen by a pole or piece of timber a tear of the small intestine comes to my mind. Blows with large objects or falls rarely produce such injuries, but are much more apt to cause rupture of the solid viscera, and I should like in this connection to say that many

cases of tear of the liver and kidney, particularly the latter, should not be subjected to immediate operation except there be evidence of excessive hemorrhage. In the kidney cases a large hematoma, bloody urine and some general evidence of the loss of blood need not indicate operative interference unless progressive, for the majority of such cases will recover without subsequent infection and operation will in nearly all mean nephrectomy. Many ruptures of the spleen also recover without operation, but watching here is accompanied by a great deal of risk.

I am convinced that in these traumatic cases, unless perforation is strongly suspected or profuse bleeding is taking place, operation during shock is a great mistake. The experience of all surgeons during the Great War tends to confirm this opinion.

In regard to intestinal obstruction I should like to refer to one practical point. It is generally recognized that it is a mistake to do an immediate resection of the large intestine in the presence of an acute obstruction, but it is well to warn the inexperienced against an error which most of us at one time have committed. The procedure in these cases should be the relief of the obstruction by a colostomy placed as far away as possible from the point of obstruction so that it may not be a means of contaminating the field when later a resection is done. Another advantage is that the emergency colostomy can be left open until union is complete after the second operation. For instance if one operates for acute obstruction due to a growth in the sigmoid a cecostomy under local anaesthesia should be done, a large self-retaining catheter fixed in the cecum and the cecum fixed only to the peritoneum; when the patient is in condition for the second operation there is no risk of infection from the cecostomy and it acts as a safety valve during the healing of the anastomosed sigmoid. If at the first operation the colostomy has been made near the growth it is nearly impossible to do a sterile resection later. One is often tempted to do an immediate resection and anastomosis when operating for acute obstruction of the large intestine because the lesions may be freely movable and the patient's condition fairly good but every time I have yielded it has been followed either by a fecal leak or death. The beginner in surgery often feels it is incumbent upon him to do something more than simply save the patient's life while the more experienced is quite content with so little. Gastric lavage should precede every operation for acute intestinal obstruction.

I know typhoid perforation is a rare occurrence now-a-days but I understand that there has been a typhoid epidemic in this vicinity and as I know that some internists are still skeptical about the results of operation in perforation of typhoid ulcers I thought it worth while to quote the following figures from a paper which I read

before the American Surgical Association in 1915. At the Pennsylvania Hospital between 1901 and 1915 there were treated 5891 cases of typhoid fever; the total deaths were 481; there were 139 perforations of which 112 were operated upon with 27 recoveries (24.1%); and 27 cases not operated upon all died (*Annals of Surgery*, October and November, 1915). The success in these cases depends nearly entirely upon the time elapsing between the perforation and the operation and upon the duration of the operation.

Any discussion of acute abdominal conditions and emergencies however brief should include a reference to anaesthesia and my own feeling is that the proper choice of the anaesthetic is often the deciding factor in the issue. Infiltration or regional anaesthesia should be used in the majority of the cases, at least until the diagnosis is made and then only as much of a general anaesthetic, gas preferably, employed as is absolutely necessary. In concluding this very rambling dissertation I should like to offer the following admonitions:

1. Do not call conditions emergencies which are not emergencies.
2. Do not operate in cases of real emergency without attempting an approximate diagnosis.
3. Remember that a knowledge of the history and symptoms of the typical acute abdominal conditions is the greatest help in arriving at a correct diagnosis and give careful attention to the patient's own account of the symptoms.
4. Make your physical examination without causing pain especially in the beginning of the examination.
5. Do not hesitate to wait for necessary laboratory reports.
6. Remember that "Experience is what we get when we are looking for something else."

CHAIRMAN MIXTER: This interesting group of papers is open for general discussion.

DR. F. B. LUND (Boston): We have had so much good sense talked to us today that there is very little to be said, but there are certain things in connection with Dr. Emerson's paper on traumatic surgery that interested me very greatly. In the first place we don't know the reasons for spasm of the abdominal muscle. We know spasm of the abdominal muscles occurs in peritonitis and the more acute the peritonitis the greater the spasm, but we also know that in connection with hemorrhage there is just as boardlike an abdomen as there is in connection with rupture of a muscle. The spasm of the abdomen or muscle connected with the fracture of the rib is just as hard, often, as in connection with the perforation and in obscure cases that have been brought in to the hospital after accidents, traumatic cases, they are very

difficult to interpret. The same spasm may accompany a pneumonia or a pleurisy.

A patient was brought to the City Hospital accident room some several years ago, having been found unconscious in the backyard of a house. He was lying there in mud. He was in very great shock. We looked all over him. There were no ecchymosis on him anywhere, no fractures, and he was so ill that I didn't dare operate, but I made a diagnosis that he had a perforating ulcer of the stomach on account of the tremendous boardlike spasm of the abdomen. Just then his brother walked in. I did a transfusion from his brother and operated on his abdomen. He had ruptured his spleen by a fall out of a fourth story window. That was an example of typical spasm which might have come from a perforating ulcer. Being insane, of course he recovered. (Laughter.)

In regard to ruptures of the viscera, Dr. Emerson has very truly said that there is a case that where in doubt one must operate.

I agree fully with Dr. Gibbon's statement about making a careful diagnosis. Nobody hates worse than I do to make an incision in the wrong place and have to sew it up and look in another part of the abdomen, but if there are any conditions which require incision, it is when you are in doubt whether there is a hemorrhage or a rupture.

Dr. Gibbon spoke of the diagnosis of rupture being helped by the history. Thank God it doesn't take long to take a history. We have found that a kick by a horse, or a mule, which is even worse, or the sliding of a board off a circular saw, if that is followed by shock and spasm of the abdominal muscle, almost always means rupture of the intestine, and the knowledge of that fact has enabled me to operate successfully where the symptoms were very slight.

There is an enormous difference in spasm in different patients. In acute appendicitis, if it is in the right iliac fossa and peritoneum under the surface is involved, you get a huge spasm. In a fat patient with pus in the bottom of the pelvis you may not get any spasm at all.

There is a difference between internal obstruction and obstruction from pressure on the outside, which always involves affection of the circulation. An obstruction from the inside of the bowel due to an enterolith is an example of internal obstruction and if you have had a chance to observe, as I have, cases of enterolith, which are always gall stones, in my experience, obstructing the lower small intestine, you will find there are simply attacks of vomiting, almost no spasm, and the patient looks perfectly well. There is absolutely no obstruction to the circulation. The picture is very different from any other type of internal strangulation.

In regard to jejunostomy for obstruction, I know that it does a great deal of good, but I have had an experience of doing a jejunostomy where

a surgeon had removed an appendix. I did a jejunostomy because she was too sick to do anything else. I waited a week before exploring the abdomen and found that I had left in the bottom of that abdomen a gangrenous diverticulum. That patient didn't recover. It would have been better to look in, and in cases where you suspect gangrene it is better to be sure you don't leave it there and to do something more than a jejunostomy.

In regard to Dr. Fitz's paper on what a medical man can do for a surgeon, it was an admirable piece of common sense. These laboratory procedures, as he has said, do not take much time. I know from experience that in cases of acute appendicitis a medical man is more important than the surgeon because I know that a medical man connected with a large institution of learning not far from Boston has been very successful. A good many students have to be operated for appendicitis. I was told that he hadn't lost a case in twenty-five years. I asked him, and he said, "No, that isn't so, we have lost one case."

Those cases are operated upon by a large number of surgeons and the only reason for that good record is that he as a medical man who sees the case first, sees that they are operated on early, due time being taken for laboratory tests, and careful examination, but that doesn't take much time, after all.

There is a lot I should like to say, but I think my time is up.

DR. DAVID CHEEVER (Boston): Mr. Chairman, I think you and your Secretary are very much to be congratulated on having staged one of the most interesting discussions that I have ever heard and one that is going to be most helpful to all of us. I wish particularly to pay our acknowledgments to our distinguished guests from New York and Philadelphia who have given us just exactly what we knew we had a right to expect from what we have already read of their views in the medical literature.

I also think we ought to pay tribute to the enlightened position which Dr. Fitz takes. It is exceedingly reassuring to our surgeons to find that a medical man feels as he does, and even I think we won't quarrel with his oft reiterated designation of the physician in these cases as the assistant of the surgeon. It is a little bit unusual but it is quite the proper attitude, I think, in these acute surgical emergencies.

I remember when I was younger getting out of bed one night at three o'clock and going to see a young man with what seemed to me to be an acute surgical emergency. There was present a very distinguished internist, a member of the staff of one of our oldest hospitals, a man many years my senior, who brought up so many points of what I call finesse in diagnosis that he finally succeeded completely in refuting my

diagnosis, my feeling that an acute emergency existed. I went home quite crestfallen and went to bed, but I couldn't sleep. I got up early before he got up and went back to the patient and again satisfied myself that there was sharply localized tenderness and muscle spasm over the appendix. Fortunately, the young man took my point of view and a gangrenous appendix was removed in a very brief time. Of course we have all had that experience. That is the danger of too much finesse in diagnosis in cases where immediate action is urgently required.

I think that Dr. Fitz paints a perfect Utopia for surgeons. I am afraid that we would all be spoiled if all of our medical consultants took his point of view. I am afraid that we would be lulled into a false position where we might all become merely technicians and carpenters, because everything would be done for us.

I think that the surgeon should have his own opinion about the medical aspects of the case. I happened to have a hospital appointment where part of the service was medical and I got rather in the habit of using the stethoscope, and subsequently I did work on the dispensary district where I saw many medical cases so that I have always made it a habit to use the stethoscope. I made quite a lasting reputation for myself in one instance at the Brigham Hospital during the Clinical Congress of Surgeons where one of the attending surgeons was taken suddenly with an acute attack, diagnosed as an acute abdominal emergency of a surgical nature, brought into the hospital, and I was asked to see him. I went over him with the stethoscope and picked up what the medical house officer had not happened to find, and that is pericardial friction rub, which of course settled the diagnosis. So it is very important that we surgeons should maintain the medical point of view as well as that the medical man should maintain the surgical point of view.

One of the wisest publications that I know, the *Old Farmers' Almanac*, used to contain a very shrewd remark: "All signs fail under certain conditions." That is very true in acute surgical emergencies.

Last night at about half past ten I was talking with one or two of the gentlemen here about acute surgical conditions. I got home at eleven o'clock and found a call stating that an apparently very acute case was being brought into the hospital. I went right back to Boston, found a woman with negative previous history, who at a quarter of one in the afternoon yesterday was left by her sister in apparently a perfectly normal state of health. At one o'clock her husband came home and found her in the bathroom on the floor in a state of collapse. A doctor was called in at half past one, who, on the basis of a fish dinner the day before, made a diagnosis of food poisoning. I don't know what physical signs there were. Matters went on during the

afternoon until half past nine at night when another physician was called in consultation and diagnosed an acute surgical condition and arranged for the entrance of the patient into the hospital. I saw her then at about half past eleven. She was pulseless at the wrist; the cardiac rate at the apex was 140; her systolic blood pressure was about 55; the lungs were negative; the heart was negative except for its obvious faint sounds; the abdomen was absolutely soft throughout, no spasm, no tenderness anywhere, no mass could be felt; vaginal examination showed nothing except a soft cervix, no mass to be felt, no tenderness. As far as the history could be obtained, which was very meager, the patient had gone over her last period four days only. There had been no symptoms of pregnancy.

I felt that this was no time for any of the minutiae of diagnosis and in view of the fact that hemorrhage was probably proceeding, it seemed to me that in spite of the shock the first thing to do was to stop that hemorrhage, especially as simultaneously with that could be made preparation for a transfusion so no time would be lost. She was put on the operating table instantly. It took about twelve minutes to open the abdomen and tie off a ruptured extra-uterine tube and remove it. There was more blood in the abdomen than I have seen in the abdomen of any living person.

I bring that to the attention of Dr. Lund because he has voiced the almost universal experience that acute hemorrhage of the abdomen means tenderness and spasm.

By the time we were through the transfusion was ready. She had been given saline solution by hypodermoclysis and now 500 c.c. of blood were immediately put in. She appeared to come back for about half an hour fairly well, when all of a sudden she gave a gasp and died.

There is one of those terrible emergencies with which we are all faced. I suppose we can say that if that first doctor had been able to make the diagnosis that patient's life would have been saved. That doctor is a busy practitioner who perhaps averages 25 to 40 patients a day in his office and in private practice, and who sees 500 or 1000 cases of functional disturbance of the abdominal viscera to one case of an acute surgical lesion, and I think it is too much to expect that physician to have made the proper diagnosis at that time.

I just cite that as a matter of personal experience which I think teaches us more perhaps than does any other method.

DR. I. J. WALKER (Boston): I think we are all very grateful for these most interesting papers. I merely want to say a word on one aspect of Dr. Whipple's paper, and that is, acute intestinal obstruction. I wish to refer solely to those cases that follow shortly after operation. These are

chiefly, as we see them, cases of appendicitis where drainage has been instituted. These cases usually appear anywhere from the seventh to the tenth or twelfth day. About the first symptom that they really show is vomiting. That vomiting will be repeated and repeated in spite of stomach washing. When vomiting has been going on a few hours, then these patients will show up with intermittent abdominal cramps. In the early cases we do not expect to find distention. It is only in the late cases that this is present; also, we expect to see no visible peristalsis in the early cases. The increased peristalsis can and should be discovered by the use of the stethoscope. The late cases, of course, do show the distention and the visible peristalsis.

Of course, it is with the early cases that we hope to make progress and, therefore, those are the ones that we should endeavor to discover early. As to the treatment of those early cases, I believe where the patients are in good condition, as they usually are in the early cases, one is justified in seeking and removing the cause of the obstruction. In the late cases, those that are sick, that have gone on perhaps a day and a half or two days, I believe the less done for that patient in the way of surgical technic the better.

All, of course, should be washed out previously to operation; all, of course, should be given salt solution. As to the operative technic in the type of case where little can be done, that should be carried out, of course, under novocain, and I believe quite thoroughly that it should be a jejunostomy. Later on, that is, from two to five days, providing the patient's bowels have not moved, then I think you are justified in going in and seeking your cause of obstruction. The patient by that time will, if ever, be in good condition and you can go in fairly safely; whereas, if you go in and do a major abdominal operation seeking the obstruction in the very sick patients the outcome will not be good. The after treatment of those cases, of course, is more salt solution and drainage through the jejunostomy.

I want to also speak of the technic of jejunostomy. One of the writers said that it had been condemned because of the poor way it had been carried out. I quite agree. I have seen quite a few jejunostomies carried out with a very large catheter or Paul or Mixer tube. That is absolutely unwise. All you need is a small opening with a No. 14 or 16 French catheter, remembering that the contents of the jejunum are liquid and that you need an opening only large enough to get rid of the liquid content and gas. That is all that is necessary. Remember also that where you make a large opening in the jejunum when your tube comes out that your patient will lose a large amount of nourishment and may die of starvation. Therefore you want the smallest possible opening.

Our results as far as enterostomy is concerned in general peritonitis I am sorry to say have

been very poor. We at the present time feel that enterostomy for general peritonitis is not a justifiable operation. However, we do feel strongly that jejunostomy in the presence of obstruction of the small intestine is a life saving measure.

DR. G. W. W. BREWSTER (Boston): Mr. Chairman and Gentlemen: Dr. Cheever has already expressed in a very charming way my feelings about this meeting this morning. I think the unusual interest in the subject and the interesting papers given have been an epoch in the Massachusetts Medical Society. I didn't hear the first two papers, but the papers that I have heard and the discussion I have been able to understand. I have heard few papers in the last few years in which the subject has been put in a way that I could understand it, because my knowledge of surgery and emergency surgery dates back to a time when we were not taught much about physiology and chemistry and we learned things more or less by rule of thumb. My teacher, Maurice Richardson, in his day probably was a brilliant abdominal emergency surgeon. I think in Massachusetts he was better known and recognized as the emergency surgeon. It was my good fortune to learn my foundation of surgery with him as a teacher, for which I shall be always grateful, and I recognize the fact that if I have accomplished anything it has been due to his teaching. A better surgeon never drew the breath of life. His warning to students in emergency work always was, in doubt, wait. If the diagnosis was absolutely certain and you knew what you were doing, nobody acted quicker than he, but in my experience I have never known of his not waiting in the doubtful case in which twelve hours or twenty-four hours did not show whether the operation should be done or should not.

Mixing pneumonia with appendicitis has been the bane of the emergency surgeon. I never knew Dr. Richardson to operate on a case in a young person which turned out to be pneumonia after the onset symptoms.

Dr. Whipple spoke of the Paul-Mixer tube. I agree with him that the modern method of jejunostomy is infinitely better, but the Paul tube in this locality is known as the Mixer tube, Sammy-Mixer tube, or perhaps erroneously so, but at the time it was used twenty-five and thirty years ago in emergency work and in intestinal obstruction particularly it served a very important office.

When Dr. Fitz stood here before us and spoke in his very finished way and we realized that only a few years ago his father stood before these meetings and echoed sentiments which were almost identical with what he said, it made me feel

very proud to have lived in a time when his father, Dr. Fitz, Senior, promulgated the importance of the work of the surgeon and the medical man in the study of their cases. No recollection is so fine to me as the days when Maurice Richardson would take Reginald Fitz (R. Fitz as we called him) off into some part of New England on an emergency case to back each other up in making a diagnosis and deciding the best thing for the patient. The first paper I ever read was in a near medical society, as a young man desiring to make an impression on medical consultants and to say something they would like, was on the subject of the cooperation of the physician and surgeon. But that has been going on ever since surgery began, and especially emergency surgery, and it is a pleasure to hear Dr. Fitz go back and echo it all. I would say this, however, that I believe it is easier for the surgeon to become a good medical man than it is for the medical man to have good surgical judgment. That perhaps I can't prove. (Laughter.) I will say, however, that the medical man will never get the kind of surgical judgment that he could get unless he follows his case through the hands of the surgeon and in the operating room.

I have seen in my experience with consultants in neighboring cities men who always follow their patients through the surgeon's hands, because they don't have many surgical operations oftentimes and they are interested to learn. I have seen in ten years a man's judgment, who practices in the country, improve on surgical diagnosis and surgical indications, so that I would prefer his surgical judgment today to many of the medical men who have opportunities to see surgery all the time in the hospital clinics.

I could talk forever on this subject but I am sure my time must be up. Thank you. (Applause.)

DR. D. F. JONES (Boston): I have very little to add to this discussion, Mr. Chairman. I simply would like to thank Dr. Whipple and Dr. Gibbon for coming here and bringing these very important subjects before us. Of course there isn't anything that is so important, there is no way of saving human life so frequently as in knowing how to handle emergency cases.

For the benefit of the medical men and the general practitioners present I should like to say that I don't believe many surgeons here expect them to learn by rote and to get into their heads all the variations and the symptoms one must have in order to make a diagnosis. I have always felt that if a general practitioner could only get into his head a few symptoms which were suggestive of some acute abdominal condition that that is all the surgeon and the community could demand of him. He is busy; his

time is taken up with all sorts of things, and for him to feel that he must wait until he can make a diagnosis seems to me to be asking more of him than we ought to ask; but I do feel that if he can get a few suggestive symptoms which will warn him that help is needed, that is all that will be necessary.

I should like to say just one word in regard to intestinal obstruction and add a little emphasis to what Dr. Whipple and Dr. Gibbon had to say in regard to cecostomy. I feel the importance of this because I have the misfortune to see cases every now and then on whom a colostomy has been done for intestinal obstruction. That colostomy is often in such a position that it makes it absolutely impossible to do a radical operation for that particular patient. We have in the place of a colostomy a cecostomy which can be done under local anesthesia, which can be done for any obstruction of the colon, and which places the wound in a position which will leave the surgeon an opportunity to do a clean and careful operation.

I should like to call to your attention, and I rather have to smile myself when I do it because my colleagues think I am rather "hipped" on the subject, the question of the location of pain in intestinal obstruction. Ask the patient where the pain started and where it was in the beginning, the first day or the second day, and you will find that the pain due to intestinal obstruction in the large intestine is always below the umbilicus. If, on the other hand, your obstruction is in the small intestine or at the ileocecal valve, which is, of course, practically a small intestinal obstruction, then your pain will be at or above the umbilicus. Some of my friends think that this is of no importance. I personally think it is of considerable importance because if you know that you have a large intestinal obstruction, then all you have to do is to go in under local anesthesia and do a cecostomy.

On the other hand, if you are sure that it is a small intestinal obstruction, all that is necessary is to go in higher up so you can be sure to get a distended piece of small intestine and put in a small catheter, as Dr. Whipple has suggested, by the Witzel method or in some such way.

If those of you who do these cases of intestinal obstruction outside will use the cecostomy, you will be doing a great deal for the patient, because whether you or whether somebody else is going to do the next operation, it is important to have a clean field.

I have spoken of a small catheter in doing a jejunostomy. I should like to say that I think you ought to use a large tube in doing a cecostomy, that you ought to use a half-inch rubber tube put into the cecum and with the cecum infolded about it so that you have a funnel of

cecum of at least a half to three-quarters of an inch or an inch running along the tube, so when the tube is pulled out your cecostomy will close without any further trouble. This cecostomy is of great value in relieving the immediate symptoms; it is of value after you have resected your intestine and done an end to end or lateral anastomosis. I believe it is an essential thing in doing a lateral or end to end anastomosis beyond the transverse colon to always have a safety valve above, and if you have done a cecostomy for the relief of the patient you already have that safety valve. (Applause.)

DR. PEER P. JOHNSON (Beverly): The case which Dr. Cheever reported of extra-uterine pregnancy seems to me to be a very good example of the kind to leave alone. I should like to inquire if that patient was still bleeding. Some twenty years ago I operated upon such a case with a fatal result. Although there had been profuse hemorrhage the bleeding had entirely stopped at the time of operation. As a result of this experience I have never hesitated to delay until conditions have improved and I have never had any reason to regret such delay. The profound depletion favors stagnation of the blood at the ruptured point and the formation of a clot so that a later time is a better time for operation provided no attempts have been made to move or stimulate the patient or to add fluid to make up that which has already been lost.

DR. EDWARD P. RICHARDSON (Boston): I should like to say a word in agreement as to the fundamental conception in regard to salt loss expressed in Dr. Whipple's very valuable paper. We have been interested in this subject in the Massachusetts General Hospital principally through the work of Dr. James C. White.

I think the fact which Ross and Gamble pointed out that if you have loss of chloride and base from the blood, dehydration would go much further than it could otherwise, leading to a concentration of the protein in the blood and various effects, is extremely important.

I think in general the surgical profession has gotten into the habit of giving tap water by rectum after operation. That may correct dehydration. It doesn't entirely correct what we want from the patient who has been vomiting. If they vomit they lose chloride and base. Therefore, in those cases it seems to me extremely important to give normal saline by proctolysis, or subpectorally, and not rely on water alone. In intestinal obstruction and in pyloric obstruction we have large amounts of salt lost in the vomitus and a considerable amount that we can't measure poured out in the intestine. In simple occlusion of the intestine without strangulation, presumably death is due in large measure to this loss and we can accomplish a great deal by correcting it. In strangulation of the bowel with interference with the blood supply, fatal-

ity comes on too rapidly to make this factor of great importance.

In regard to supplying salt, it seems to me desirable to give this in the form of normal saline solution and not as sometimes advocated in a hypotonic solution. We then give opportunity for the patient to reject the constituent not needed through the urine, the water, the chloride or the sodium base.

We should endeavor to make good the loss produced by the vomiting and the pouring out of the salt and base into the intestine. We have got to remember that the total supply of salt in the human body is not very great.

DR. KENDALL EMERSON (Worcester): I have nothing to add except to express my appreciation of the papers to which I have listened. They seemed to me most interesting.

The only point in connection with the traumatic abdomen which I had hoped to pursue further was the question of what it is that causes the reflex muscle spasm. I had hoped at least partially to plumb that question but when I began the study of it I felt a good deal like a setter dog who meets a porcupine in a narrow trail in the woods—the only conservative action is to retreat. I gave it up because the neurologists haven't gotten very far with it, but I do believe that somewhere in neurology the surgeon will some day be assisted in interpreting the meaning of the muscular rigidity, the muscular spasm, but certainly the neurologist has not yet proceeded far to our assistance.

DR. ALLEN O. WHIPPLE (New York City): I should like to correct the impression which I am afraid I left of the condemnation of the Paul's tube. I should have limited that to its use in the upper intestine, because in my own experience I have seen cases that have been benefited by its use in the cecum. At the same time I do feel that the inversion with a valve formation by means of a tube is a better method at present than the use of the rigid glass or metal variety.

I also agree entirely with Dr. Jones in his advocating a larger tube for the cecum because unquestionably the material that is passed through is more liable to clog a small tube than it is a large one.

I was exceedingly interested in Dr. Fitz's presentation of the subject of the cooperation of physician and surgeon. That is always a very interesting subject, and I would call attention particularly to the essay of Sir Clifford Albin, entitled "The Historical Relations of Medical and Surgical Men," one of the most delightful and beautiful essays I believe in the English language, certainly in the medical literature, in which he deals with this relation of physician and surgeon. Fortunately, I think nowadays many of the differences that existed in the past are eliminated.

I should like to speak about one matter and that is the question of blood chemistry studies in these cases of obstruction. Where the patient is in the hospital, or can be easily brought to the hospital, the obtaining of the specimen for analysis by the physician is a great help. On the other hand, I think it is a great mistake to keep a patient where the question of intestinal obstruction is a prominent one until these studies can be made. Delay of that type I think is unwarranted and more patients will be saved after the diagnosis is definitely established or even question of the intestinal obstruction, with the use of salt solution before and after operation, even though we haven't the facilities for the accurate studies of the electrolytes in the blood plasma,

I certainly appreciate the papers that I have listened to this morning, and the discussion. (Applause.)

DR. JOHN H. GIBBON (Philadelphia, Pa.): Mr. Chairman, there are just one or two practical points that come to my mind in regard to these subjects which we have been discussing.

In the first place, with regard to the ruptured extra-uterine pregnancy, I should like to say that for some years in those cases that were operated upon we have put, or as much of the blood as was removed from the abdomen, immediately back into the patient's veins with very satisfactory results.

Dr. Richardson brought up the question of whether one should do a gastrojejunostomy when operating for a perforated duodenal ulcer. If the operation is done early I think the gastrojejunostomy should be done. If the operation is done late it should not be done.

There is one point in the traumatic cases that I think is worth emphasizing. We have talked a great deal about abdominal rigidity and we have learned that this abdominal rigidity occurs in the case of abdominal contusion often where there is no rupture of a solid viscus or no perforation of a hollow viscus. If you have a perforation of a hollow viscus, you have in addition to the muscular rigidity continuous and exquisite pain, and I think that this combination is often the means of determining whether or not you should operate.

There is one other thing in regard to the ruptured solid viscus. Packing was spoken of. I think that packing, if placed in a tear of a hollow viscus, does more harm than good. The place to put the packing in the rupture of a hollow viscus is outside so as to cause the edges of the tear to come together, but any packing put in a tear or incision or gunshot wound of a solid viscus I think does more harm than good. The bleeding of these cases will often stop itself be-

cause the surface has become agglutinated and your packing outside will do a great deal more towards producing this agglutination than packing inside. Lightly tied mattress sutures are better still.

In regard to this whole subject, it seems to me, Mr. Chairman, that these acute abdomens are quite like fires. We formerly rushed at them and lost our heads. I think what we want to say to ourselves about the acute abdomen is that we mustn't use dynamite where the more scientific fire extinguisher would meet the indication. (Applause.)

The meeting adjourned at twelve-thirty o'clock.

THE PRE-CONVENTION NUMBER OF THE BULLETIN OF THE AMERICAN HOSPITAL ASSOCIATION EMBODIES TWO INNOVATIONS

It is the first issue of *The Bulletin* to contain complete advance information regarding the annual convention and educational exhibit of this Association which is the continent's largest hospital association representing all races, creeds and colors.

It is the first issue of *The Bulletin* to carry advertisements, presenting to the membership what the legitimate market offers to the hospital field. The Association has applied to these advertisements the requirements of the Council on Pharmacy and Chemistry and the Council on Physical Therapy of the American Medical Association. These advertisements have also passed the scrutiny of responsible officers of the Association delegated to the task of safeguarding the principles and ideals of the Association.

The Twenty-ninth Annual Convention of the American Hospital Association will be held in Minneapolis, Minn., October 10-14, 1927. The exhibit of last year was exceeded in size by only the Automobile Show and the Railway Supply Manufacturers' Association Exhibit held in conjunction with the American Railway Association—both of which are commercial exhibits.

The Rochester Committee has prepared an excellent plan. It will send two representatives to Chicago to board the Special Train here. These committee representatives will ask each delegate to state what phase of the many Rochester activities he or she would find most interesting and profitable. Each delegate will then

be given some distinguishing mark—perhaps a colored button—indicating that choice. When the Special Train arrives in Rochester, the delegates will be greeted by the Reception Committee divided into Sections, each Section wearing some mark of identification—let us say, a colored button. For example, the Dietetic Section will wear perhaps a green button, and the group interested in dietetics, all wearing green buttons, will likely go to the Kahler Corporation and other phases of that particular work. Possibly a Grey Button Group will visit operating rooms, et cetera.

The hospitable Rochester Committee has already planned to serve luncheons to 650 guests. St. Mary's Hospital will play hostess to 200; Kahler will entertain 200; The State Hospital will serve 200; and the Rochester Diet Kitchen will care for 50. After luncheon, all groups will assemble, when the two Mayo brothers will speak to the delegates on a program which will include other interesting speakers.

It is urged that all delegates who wish to take advantage of this highly interesting and profitable stop-over privilege will immediately get in touch with their local chairman, so that they will be sure to take the Special Train.—*Circular of American Hospital Association.*

SMALLPOX GAINING IN PREVALENCE, SAY STATE AUTHORITIES

DESPITE stringent measures taken by health authorities throughout the country to control smallpox, by advocating vaccination as an immunization measure, prevalence of the disease apparently is increasing, as compared with last year, according to reports received at the United States Public Health Service, and made public July 29.

Reports from 41 States, submitted by State health officers, show an aggregate of 500 cases for the week ended July 9, as compared with 303 cases reported by those States for the corresponding week of 1926. That the disease is of greater prevalence in rural than in urban districts is shown in reports from 97 cities throughout the country having an aggregate population of more than 30,590,000 which gave a total of 94 cases for the current surveyed week as compared with 37 cases for the week of last year.

The estimated expectancy of these 97 cities, based on the experience of the last nine years, exclusive of epidemics, was 48 cases. It was stated orally at the Public Health Service, in connection with the reports, that the figures indicate vaccination is more rigidly enforced in cities than in rural sections.

Case Records
of the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN
WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 13321

BLEEDING FROM THE GUMS

MEDICAL DEPARTMENT

A Canadian of fifty-four, a spreader in an artificial leather factory, entered the hospital September 16 complaining of intermittent bleeding from the gums.

The symptom began a year before admission. During the winter he began to have cough with sputum, worse at night, keeping him awake and choking him. The sputum was white and frothy, foul in odor and disagreeable in taste. The cough gradually decreased during the summer, while the sputum steadily increased. He became more and more shortwinded until in July he had to rest in bed and could not climb even one flight of stairs without great dyspnea and fatigue. Since July his feet and legs had been swollen and occasionally stiff and painful and his eyelids puffy. Since that time he had been drinking sixteen to eighteen glasses a day and urinating a dozen times each day and night. For three months he had been troubled with gas. Since July he had had sores on his neck, at the corner of his mouth and on his right index finger said by a physician to be due to "bad blood." For the past six weeks he had had continual oozing of blood from his gums, causing constant spitting. During the past six days he had had four treatments with ultraviolet rays over his chest, front and back. He had had no loss of appetite or weight.

His family history shows nothing significant of familial disease so far as he knew. His wife had never been pregnant in fourteen years of marriage. He took some alcohol before prohibition. His general health had been good except for influenza during the epidemic and a touch of bronchitis three years before admission. He had had no other illnesses. Ten years before admission his back and left eye were burned by acid, leaving the vision impaired.

For seven years he had operated the spreading machine in a leather factory and had used mixtures which contained banana oil, gun cotton, benzene and many other chemicals unknown to him. He was the only person who was ill from bleeding, though many others had been poisoned.

Clinical examination showed a well nourished

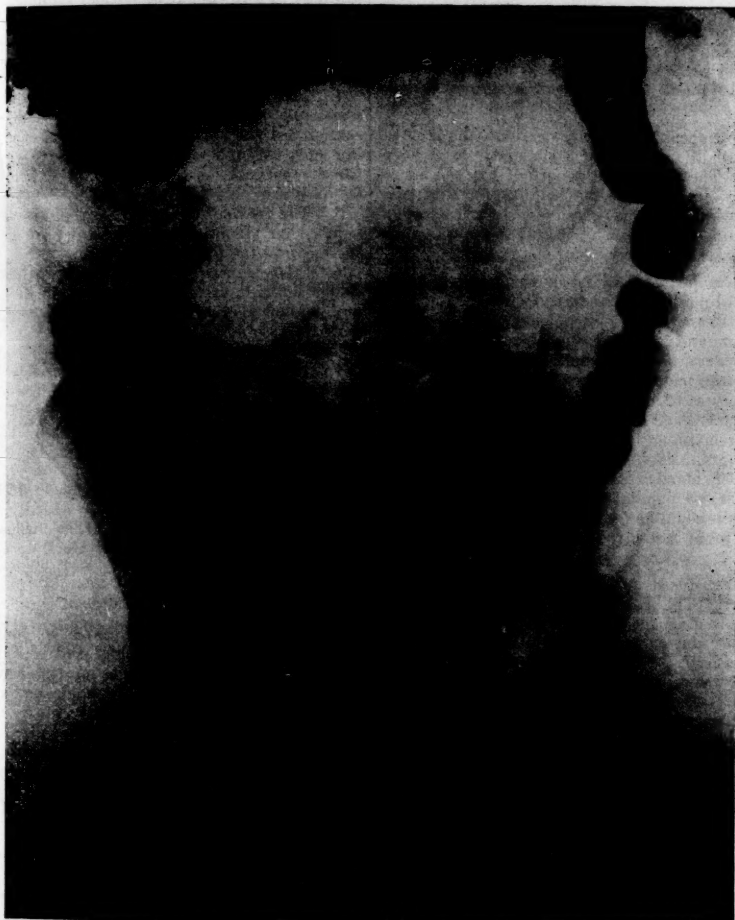
man with puffy eyelids, coughing and spitting thin bloody mucus. Mucous membranes pale. Skin seemed atrophic. Gums spongy and oozing. Many teeth missing, the remaining ones blood stained. Petechial hemorrhages on palate. Scars on right arm, right ankle and dorsum of left foot. Lesion the size of a quarter dollar on the right index finger. Questionable enlargement of the left epitrochlear glands. Throat edematous? Chest barrel shaped. Expansion poor. Lungs hyperresonant. Diminished breath sounds. Location of apex impulse of the heart not recorded. No enlargement to percussion or other abnormalities. Blood pressure 110/55 to 128/23 to 148/50. Artery walls slightly thickened. Liver edge palpable 6 centimeters below the right costal margin in the mammary line. Dome at 6th interspace. Prostate tender. Ankles puffy; no pitting. Knee-jerks not obtained. Pupils equal, regular, rebounded on reacting to light. Left fundus obscured by corneal opacity. Right showed prominent choroidal vessels with pale white disc and exaggerated cupping.

Urine 20 to 80 ounces, alkaline at four of five examinations, specific gravity 1.023 to 1.015, no albumin or sugar, occasional red cells at one of five sediment examinations, about 5 leucocytes per field at another. Renal function 40 per cent. Blood: 3,000 to 2,000 leucocytes, 16 to 17 polynuclears, 52 to 38 per cent. lymphocytes, 8 to 10 per cent. mononuclears, 4 to 5 per cent. eosinophils, 20 to 15 per cent basophils, hemoglobin 50 to 35 per cent., reds 1,940,000 at entrance, 2,350,000 after transfusion, 1,688,000 two days before death. Entrance smear showed stippling, polychromatophilia, rare microcytes and macrocytes, large filled oval forms, tailed forms and many achromic cells, a few normoblasts, few normal looking cells; two myeloblasts or lymphoblasts were seen. Platelets much reduced. Bleeding time over 30 minutes at entrance, afterwards 35, 12, 40, 6 minutes (after transfusion), 1 hour. Reticulated cells $1\frac{1}{2}$ per cent. to 6 per cent. October 12. Price-Jones measurements of red blood cells September 18, median 7.54 μ , dispersion 1.32 μ , characteristic of slight secondary anemia. Clotting time 7 to 14 minutes. No clot retraction after 48 hours. Icterus index could not be read September 16 and 18; 8 September 22. Fasting contents of stomach: 8 cubic centimeters mucous appearing white cloudy material, no sediment, free acid 4, total acid 6, guaiac negative. Test meal: 16 cubic centimeters mucous appearing blood streaked brown material with no sediment, occasional epithelial cells, frequent red cells, free acid 6, total acid 10, guaiac strongly positive. Stools: guaiac positive at 3 of 11 examinations; no macroscopic blood. Sputum white and bloody at the single examination. No tubercle bacilli. A few leucocytes, predominant organism a Gram-positive encapsulated diplococcus. Gram-negative diplococci also present in rather large numbers. A few Gram-nega-

tive bacilli. Blood culture negative. Wassermann negative.

X-ray examination with a barium enema showed nothing indicative of malignancy. The colon filled with some difficulty owing to a rather marked degree of spasticity. The cecum con-

normal. Reexamination with atropin was recommended. The diaphragms were in the normal position. There was no fluoroscopic note as to excursion. There was some thickening of the hilus glands. The lung fields and apices were essentially clear. The skull and long bones were



Barium enema. Shows nothing indicative of malignancy. The colon filled with some difficulty owing to a rather marked degree of spasticity. The cecum contained a large amount of gas and could not be completely filled.

tained a large amount of gas and could not be completely filled. Examination with a barium meal showed the esophagus and stomach normal. The duodenum filled with difficulty, and at no time was it completely filled. At the six-hour examination the stomach was empty. The head of the meal was in the cecum. The cecum was

negative. There was no evidence of mediastinal tumor or of malignancy. Another examination of the chest the following day confirmed these findings. Portable plates a week later were rather unsatisfactory, but as far as could be determined there had been no change in the chest since the last observation.

Temperature for the first week 98.6° to 101.5°; afterwards only three times below 101°, maximum 105.7°. Pulse 80 to 145. Respirations 20 to 48 with a terminal increase to 67.

September 17 examination showed a few purpuric spots about the axillae and on the soft palate, ecchymosis on the right knee, the left lung dull, with decreased voice and breath sounds. The spleen was easily palpable. Continuous with the liver and descending on respiration he found an ill-defined, irregular, doughy mass.

September 23 a biopsy was done, the removal of a small fragment of a rib under local novocain. The pathologist reported that the microscopic sections were not suitable for diagnosis. Following the biopsy there was elevation of temperature and pulse. September 24 650 cubic centimeters of blood was transfused.

September 27 and 28 in examination of six cover-slip smears 112 leucocytes were found. Of these 12 per cent. were possible lymphocytes of medium and large size, slightly atypical. 58 per cent. were neutrophilic cells; polynuclears 12 per cent., metamyelocytes 7, myelocytes 12, premyelocytes 6, myeloblasts 18, unclassified 4,—as nearly as these atypical cells could be classified. The remaining leucocytes contained basophilic large granules, i. e. were mast cells. In smears made September 29 stippling and basophilia, diffuse and punctate, were common. Nucleated red cells could be found. Naked pyknotic nuclei were found not infrequently.

September 29 400 cubic centimeters of blood was transfused and October 3 650 cubic centimeters. The patient went downhill steadily. The bleeding from the gum stopped for three or four days after each transfusion, then recommenced. October 8 700 cubic centimeters of blood was transfused. The temperature rose to 104.5°. October 12 450 cubic centimeters of blood was transfused. The temperature dropped to normal, but rose in the evening to 102°. The respiration was 60. The patient was mentally clouded. He sank rapidly. October 13 a medical consultant wrote: "Clinically this case is atypical if the condition is due to benzol. He has an appearance suggesting peripheral blood destruction which is borne out by the icteric index, and this is rarely if ever due to benzol. In addition to peripheral blood destruction he now shows evidence of practically complete bone marrow aplasia. This last is characteristic of benzol. The undifferentiated character of many of the white cells, the leucocyte count of 2,000 and the changed character of the red cells suggest toxic action of some sort on the bone marrow. . . The influence of benzol cannot be ruled out. If it is present an additional unknown factor seems to me to be present."

October 14 the patient died.

DISCUSSION

BY RICHARD C. CABOT, M.D.

NOTES ON THE PHYSICAL EXAMINATION

1. The urine examination shows nothing significant. There should be normal kidneys.
2. There is free hydrochloric acid, so, as Dr. Minot would say, it is not pernicious anemia.
3. There is nothing of importance in the sputum examination.
4. The X-ray examination shows that the esophagus, stomach and colon are normal. We cannot test the small intestine because the barium goes through so quickly. We have gone as far as we can from both ends of the gastrointestinal tract.
5. The reexamination with atropin is recommended on account of the difficulty of getting barium into the duodenum (spasm).
6. "There was no evidence of mediastinal tumor or malignancy." They are looking for any possible source of this anemia in some deep seated tumor and they have not found it. The doughy mass may be gall-bladder for all I know.
7. In order to see if this can possibly be a bone marrow tumor they take out a piece of rib under local novocain.
8. I think we should ordinarily find 112 leucocytes in one portion of one smear. That is an extraordinarily low count of leucocytes.
9. "In addition to peripheral blood destruction he now shows evidence of practically complete bone marrow aplasia." That means the bone marrow is not doing any work at all in forming new red cells.

DIFFERENTIAL DIAGNOSIS

The main interest in this case is its contrast to pernicious anemia. The chief contrasts are as follows; in the first place he has no tongue symptoms. That is something you should always ask, because patients usually do not mention it unless you ask them. In the second place there are no finger symptoms. In pernicious anemia you usually get numb fingers. In the third place there is no achylia, which I agree with Dr. Minot is as reliable as any sign of pernicious anemia we have. Fourth, this case goes steadily down from bad to worse. Pernicious anemia does not do that. The red count goes down and up once, twice or three times, and usually that is the last. Pernicious anemia is never progressive. This anemia is progressive and therefore not pernicious. Fifth, there are a good many points against pernicious anemia in the blood: the strikingly small number of polynuclear cells and the absence of any enlargement of the red cells, which we almost always get in pernicious anemia. As far as I know there are only three diagnoses to be considered: (1) an aplastic anemia, an anemia in which the bone marrow does nothing; (2) benzol poisoning, which so far as I

know cannot be distinguished post mortem except that if you find no cause you call it aplastic, and if you find a cause it is poisoning. (3) The third possibility which I do not know how to exclude is bone marrow tumor. They have been over the body pretty carefully. I should say. There was something below the liver. It is described only once and never mentioned again. I do not know whether to take it seriously or not. I do not know any tumor of the liver that will give us a picture like this. If it had been hypernephroma they probably should have got some evidence of metastasis in the bones, whereas so far as I know bone marrow tumors do not show characteristic X-ray changes.

A PHYSICIAN: Would you consider an aleukemic leukemia?

DR. CABOT: That is the same as bone marrow tumor, so far as I know. I should rather call it bone marrow tumor. Leukemia means white blood. To say "white blood disease without white blood" is rather ridiculous.

A PHYSICIAN: In this section of the country benzol poisoning is rather common, is it not?

DR. CABOT: It has seemed so lately. We have seen much of it during the past two or three years, because that type of industrial disease has come in in the late years with the use of new chemicals that the manufacturers do not know much about. We see it most in the rubber factories.

A PHYSICIAN: This patient worked in an artificial leather factory.

DR. CABOT: Yes, but most of the cases have been in relation to rubber.

I cannot say any more. I do not know how to exclude benzol in this case. I do not know how to exclude a marrow tumor. I think it is between those two rather than the so-called aplastic anemia. A few years ago I should have said, What is the use of taking up this time in discussion? It does not make any difference anyway. Now we say, If it is pernicious anemia we can cure it. The only thing I am sure about is that it is not pernicious.

A PHYSICIAN: Is the optic opacity significant?

DR. CABOT: It has no significance that I know.

MISS PAINTER: The patient worked with a substance that was composed of cellulose with a benzol solvent.

DR. CABOT: So that he did use benzol. Of course the fact that he used it is not proof that he got poisoned by it, but of course it is very suggestive with such a blood as this.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)
Aleukemic myelogenous leukemia.

DR. RICHARD C. CABOT'S DIAGNOSIS
Anemia due to benzol poisoning or to bone marrow tumor.

ANATOMIC DIAGNOSES

Anemia, atypical.

Bronchopneumonia.

Hyperplasia of the bone marrow.

DR. MALLORY: We pathologists I think have been a little bit spoiled because we are generally accustomed to have the last word on everything, but this is one case in which we could not get any farther than the clinicians. He certainly did not have an aplastic anemia. We can say that definitely, because he had a very red bone marrow and microscopically it showed a very rapid production of red cells and also of the white cells. Why these rapidly forming blood elements were not being distributed into his peripheral blood stream I have no idea. The proportions in the femoral bone marrow, which of course in a normal person is composed almost purely of fat, were approximately the proportions of white and red cell formation that we normally find in the vertebral or sternal marrow, where red and white cell formation goes on under normal circumstances. The picture was not that of a myelogenous leukemia, or even of the aleukemic leukemia, a term used where the bone marrow is completely filled with rapidly forming cells of the white cell series. In this case there were more reds being formed than whites, and there was nothing to suggest a neoplasm.

As to his other organs, he had a slightly enlarged heart and some congestion of the liver and kidneys. There was a slight, not a very definite cirrhosis of the liver.

The spleen was fairly large, about 480 grams, and much congested. On microscopic examination a good many normoblasts were seen there and a great many phagocytic endothelial cells which were ingesting red cells. That is something that we very commonly find in hemolytic anemia, but it is not in itself sufficient to make a diagnosis.

A PHYSICIAN: Was there any evidence of benzol?

DR. MALLORY: The two cases of benzol poisoning I have seen had absolutely aplastic marrows, whereas here we have an extremely hyperplastic one. I have seen the marrows of rabbits treated with benzol where in certain stages you get a hyperplastic marrow, but nothing comparable to this. I cannot say that it is not benzol, but it is not characteristic of any of the fatal cases that we have seen here.

DR. CABOT: I still think benzol is the best guess.

CASE 13322

FEVER AND GLANDS IN THE NECK

MEDICAL DEPARTMENT

An unmarried Nova Scotian stenographer twenty years old entered March 25 complaining

of periods of fatigue and weakness with fever.

Three years before admission a bunch, not tender or painful, appeared over her left clavicle for two months and disappeared. Several months later a similar mass appeared over the right clavicle. This has been more or less persistent. In April, eleven months before admission, she had an attack of weakness and fever of sudden onset lasting a week, with very severe night sweats. The mass over the right clavicle became much larger at the onset and with the subsidence of fever diminished in size markedly. This attack subsided quickly, leaving her feeling as well as ever. After the attack she had periods of fever about every two or three weeks lasting five to seven days with burning of the face and drenching night sweats. With each attack she had dyspnea on exertion, cyanosis of the lips, yellow skin, swelling of the glands and unproductive cough. She thought she had grown much paler since the onset. Between the attacks she felt very well. Occasionally during an attack she had pain under the sternum after a meal. During the febrile periods her appetite was poor and all food tasted bad. During the attacks she did not go to bed, but lay down only when she felt excessively tired or when the fever was high. Four years ago she weighed 99 pounds, her best weight; last June 95 pounds; her present weight was 84 pounds. Since September she had rested at home. For six months she had urinated once at night.

Family history unimportant.

Past history. Bowels constipated for years. For nearly a year she had not menstruated. Most of the time she had yellow leukorrhea. She was very nervous. One night she had a "painful stiffness" in the legs. She had palpitation; sometimes her heart beat very hard.

Clinical examination showed a rather emaciated, sallow, anemic looking young girl in no distress. Teeth carious and neglected. Pyorrhea. Throat slightly inflamed. Tonsils ragged. Pea sized left supraclavicular and right axillary glands, a prune sized right supraclavicular gland and an olive sized left axillary gland. Below the left costal margin a firm round mass the size of a peach, thought by the entrance examiner to be probably a gland. A later examiner thought it was the spleen.

Apex impulse of the heart seen and felt at the third left interspace, where a systolic murmur was best heard. Blood pressure 95/47. The upper abdomen showed spasm, probably voluntary, and the mass mentioned. Genitals not examined. The rest of the examination was negative.

Urine: amount not recorded, cloudy and turbid at 2 of 4 examinations, otherwise not remarkable. Blood: 10,100 to 11,500 leucocytes, polynuclears 69 to 77 per cent., hemoglobin 50 to 60 per cent., reds 3,950,000 to 4,100,000, moderate achromia, slight variation in size, occasion-

al poikilocytosis; platelets increased, much clumping. Wassermann negative. Stools, guaiac faintly positive at 1 of 4 examinations.

Temperature 97° to 99.2° until April 1, then 99.3° to 103.2°. Pulse 74 to 121. Respirations 20 to 30.

X-ray showed large dense lobulated shadows at both lung roots, more extensive on the left. Also some increase in the midshadow above the heart on the right, and a small round dense area just below the left clavicle, apparently in the parenchyma of the lung. The rest of the lung fields was clear. The heart shadow was apparently enlarged and of the mitral shape.

March 28 X-ray treatment was begun. Four treatments were given. March 30 a left axillary gland was removed for biopsy. April 6 the patient was discharged to return in a month for further treatment.

DISCUSSION

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

1. Of course the two diseases in our minds are Hodgkin's disease and tuberculosis.
2. The blood pressure is notably low.
3. "The heart shadow was apparently enlarged, and of the mitral shape." That means increase in the region of the left auricle, but I think they are going too fast when they say the heart is "of mitral shape."

DIFFERENTIAL DIAGNOSIS

We have no evidence of tuberculosis and plenty of evidence of tumor. What else besides Hodgkin's disease, lymphoblastoma, can this be? At her age I know no other common tumor in this situation. We are given no evidence of tumor elsewhere from which this could be metastatic. With her blood picture, excluding leukemia I can not think of anything else. I believe the biopsy showed lymphoblastoma, or Hodgkin's disease.

PATHOLOGICAL REPORT

An axillary lymph node measuring 2 by .8 by .8 centimeters. It is firm, homogeneous in cross section, with no evidence of normal lymphoid structure. Histologic examination of the remainder shows a complete obliteration of the normal nodal structure. The tissue is infiltrated with large atypical cells of the lymphocyte series, some with huge vesicular nuclei, others with lobulated or multiple nuclei. There is marked increase in eosinophils and a considerable though not extremely dense fibrous stroma.

Lymphoblastoma (Hodgkin's type).

FURTHER DISCUSSION

DR. TRACY B. MALLORY: The gland was entirely typical of Hodgkin's disease under the

microscope. We were unable to make out any of the normal lymphoid structure. The peripheral sinus and the lymph follicles were all obliterated. The entire tissue consisted of cells of the lymphocyte series embedded in fairly dense stroma, with a few very large mononuclear cells some of which were multinucleated, also a very large number of eosinophils. The most characteristic picture of Hodgkin's disease that you can imagine.

LATER NOTES

Records of the X-ray Therapy Clinic show four later visits. May 2 she showed very marked improvement. Her color was good, she felt as well as usual and had gained five pounds. She still presented a gland about two centimeters in diameter just above the right clavicle, a few smaller glands in the right neck, also minute glands in the left neck and both axillae. The spleen could just be felt on deep inspiration. The liver was not palpable. The inguinal glands were not enlarged. Blood: 7,000 leucocytes, 4,920,000 red cells, hemoglobin 65 per cent. No treatment.

June 6 she had had a return of the gland in the left anterior cervical chain. It had been somewhat tender, and was now about 2 by 3 centimeters. She felt tired, but otherwise well. June 8 the gland in the left neck was treated without reaction.

July 11 the glands had all disappeared. Her general condition was better. She was still gaining weight, and was now within three or four pounds of her best weight. The spleen was not felt. No treatment indicated at present.

DIAGNOSIS

Lymphoblastoma, Hodgkin's type.

BENEVOLENT FRATERNITY FRUIT AND FLOWER MISSION

THE North and South station booths of the Benevolent Fraternity Fruit and Flower Mission have had practically no flowers and vegetables left at them this season which began the first of June and will continue until October. Unless the commuters begin at once to leave their flowers and vegetables it will be necessary for the Mission to discontinue this branch of their work. Mrs. Lewis A. Elliott, Executive Secretary of the Mission, attributes this lack of interest partly to the unusually poor season which is being experienced at the present time. The flowers left at the booths or at Horticultural Hall are called for each day by hospitals and settlement houses of Greater Boston and are used to bring cheer to the poor and unfortunate. The North Station Booth is situated in the parcel room while the South Station Booth is in the baggage room. Flowers and vegetables may be left every day before noon and may be left at Horticultural Hall at all times.

The hamper work of the Mission is now in full swing and is being handled under the direction

of the Executive Secretary with the assistance of Mrs. Harry Aronson and the Board of Directors. Lettuce, beans, peas and all types of vegetables are urgently needed to feed the many poor people who are suffering from malnutrition.

AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS

DR. THOMAS R. CROWDER, president of the American Association of Industrial Physicians and Surgeons, has appointed a committee to study the health and safety hazards in the twelve major industrial groups represented in the membership of the Association. These groups include: automobiles, chemicals, electrical, food, foundries, iron and steel, metal, mining, public utilities, rubber, textiles, and office and trade.

Each member of a committee will make an investigation of those conditions in his own organization entailing possible or positive health hazards. This information will be assembled for analysis and study. The results will be made available through the *Bulletin* of the Association.

It is expected that the assembled information resulting from this study will form a valuable contribution to the question of industrial medicine and hygiene in this country where this investigational type of work has lagged behind a similar work in Europe. On the other hand the development of medical organizations in industrial work in America has far outrun a similar activity in European industry. With the completion of the work now under way by this committee, the health problems of major industrial groups in this country should be better appreciated than they are at the present time.

PROFESSOR LINBERG IS VISITING THE UNITED STATES

PROF. BORIS E. LINBERG, Dean of the Medical Faculty and Director of the Surgical Clinic of the University of Smolensk (Russia), has arrived in this country for a stay of a few months to study recent developments in the field of American surgery and the organization of surgical hospitals and clinics in the United States. Professor Linberg is now at Rochester, Minn., at the invitation of the Mayo Bros. clinic, and he will remain there until the later part of August.

His further plans include visits to medical institutions in Chicago and in Boston, and he is planning to return to New York in the beginning of September. While in this country, Professor Linberg has also been requested by the Soviet Department of Education to make a survey of the American market of surgical and medical supplies and equipment with a view to possible eventual purchases for the requirements of Russian university clinics.

THE BOSTON Medical and Surgical Journal

Established in 1828

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The Journal does not hold itself responsible for statements made by any contributor.

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BRAIN TUMORS

It is occasionally remarked by general practitioners that they never see patients with brain tumors. This can only mean that there must be many patients with signs of increased intracranial pressure that are overlooked. In other words, the number of brain tumors recorded in the local physician's case-book will vary directly with his diagnostic acumen. The one point of importance, however, is that only by early diagnosis and operation can successful results be obtained. Some interesting figures from The Thirtieth Annual Report of the Peter Bent Brigham Hospital, Boston, 1926, will bear out the above assertions.

In 1925, there were recorded one hundred and fifty-seven operations for intracranial tumors; in 1926, two hundred and seventeen. In spite of the increase in the numbers of patients operated upon, the operative mortality dropped from fourteen to eleven and one-half per cent.

When one considers the desperate nature of many of these operative procedures, it is not surprising that the mortality rate runs over ten per cent. It was not many years ago that a mortality rate of fifty per cent. was not considered exceptional. In his report, the surgeon-in-chief of the

hospital, Dr. Harvey Cushing, points out some striking facts in regard to his patients. He finds that the average sojourn in the hospital of patients with brain tumors is about three weeks. This appears to be a very low figure, considering the difficulties likely to be encountered in the differential, the localizing and the pre-operative pathological diagnosis. In patients with obscure symptoms, more than one examination must be made, and sometimes more than one observer has to attack the problem. It is to be noted, moreover, that on account of the time required for a single intracranial exploration, not more than one patient can be successfully operated upon in a single day. The newer operative measures, such as electro-surgery are, also, extremely time-consuming and physically exhausting for the surgeon. If attempts are made to speed up these operations, or to do more than one in a single day, mistakes in diagnoses inevitably creep in, and the mortality rate is raised.

No branch of surgery offers more difficulties than that of neurological surgery. It is truly surprising that a patient with such an obscure lesion as a brain tumor may enter a hospital, be examined, have the new growth localized and removed, and the patient be sufficiently convalescent to leave the hospital within a three-week period. With patients coming to the hospital earlier in the course of their disease and with the increasing accuracy of localizing diagnosis, the time may not be far off when ten days of hospitalization may be sufficient, and the mortality rate may fall below three per cent., which is about the average for a general surgical service.

A CHANGE IN THE LAW GOVERNING INDUSTRIAL ACCIDENT INSURANCE

The change in the law under which the Department of Industrial Accidents is in operation went into effect July 25, 1927. The interpretation of the wording of the law which deals with medical service is being studied and the conclusions will probably be ready for publication in the early autumn.

The text of that portion of interest to physicians is as follows:

SECTION 30. During the first two weeks after the injury, and, if the employee is not immediately incapacitated thereby from earning full wages, then, from the time of such incapacity, and in unusual cases, or cases requiring specialized or surgical treatment,* in the discretion of the department, for a longer period, the insurer shall furnish adequate and reasonable medical and hospital services, and medicines if needed together with the expenses necessarily incidental to such services.* The employee may select a physician other than the one provided by the insurer, and in case he shall be treated by a physician of his own selection, or where, in case of emergency or for other justifiable cause, a physician other than the one provided by the insurer is called in to treat the injured employee, the reasonable cost of his

*Added April 27, 1927, and became effective July 25, 1927.

services shall be paid by the insurer, subject to the approval of the department. Such approval shall be granted only if the department finds that the employee was so treated by such physician or that there was such emergency or justifiable cause, and in all cases that the services were adequate and reasonable and the charges reasonable. In any case where the department is of opinion that the fitting of the employee with an artificial eye or limb, or other mechanical appliance, will promote his restoration to industry, it may order that he be provided with such an artificial eye, limb or appliance, at the expense of the insurer.

BOVINE TUBERCULOSIS IN MASSACHUSETTS

A VERY important conference was conducted in Amherst July 28, 1927, at the Massachusetts Agricultural College during the sessions of farm and home week dealing with bovine tuberculosis in Massachusetts. Dr. E. A. Crossman, who is in charge of federal bovine tuberculosis in Massachusetts eradication, referred to the expenditure of \$1,500,000 by Massachusetts the past few years in its attempt to eradicate this disease and feels that there is little ground for believing that any considerable measure of control has been attained. He felt that we cannot reasonably expect to attain to the conditions in Maine for some time because Maine seems to have had fewer infected cattle to deal with, but that Massachusetts can confidently expect to be on a parity with Connecticut.

Professor J. H. Frandsen of the department of animal and dairy husbandry at the Agricultural College is convinced that the cattle in Massachusetts are more infected than those of the neighboring states and that vigilance should not be relaxed. He argued in favor of increasing the indemnity to owners of infected cattle to the end that farmers would be more co-operative.

Although some eminent students of bovine tuberculosis consider the problems incident thereto more of an economic than a public health question, many physicians feel that the bovine tuberculosis is a definite menace to human beings and that the whole subject is an important public health matter.

The sessions were well attended and much interest was manifested.

THIS WEEK'S ISSUE

CONTAINS articles by the Following Authors:

JOHNSON, PEER P., A.B., M.D. University of Vermont 1900; F.A.C.S. Chief Surgeon at the Beverly Hospital. His subject is "Diagnosis and Management of the Acute Surgical Lesions of the Lower Abdomen." Page 205. Address: 163 Cabot Street, Beverly, Mass.

RICHARDSON, EDWARD P., A.B., M.D. Harvard 1906. F.A.C.S. Associate Professor of Surgery, Harvard Medical School; Chief of West Surgical Service, Massachusetts General Hospital. The title of his paper is "Acute Surgical Lesions

of the Upper Abdomen." Page 210. Address: Massachusetts General Hospital, Boston.

EMERSON, KENDALL, A.B., M.A., M.D. Harvard 1901, F.A.C.S. Chief of Surgical Service and Orthopedic Surgeon to Memorial Hospital, Worcester, Consulting Surgeon Fairlawn Hospital and Louis Pasteur Hospital, Worcester. He writes on "Traumatic Lesions of the Abdomen." Page 214. Address: 21 High Street, Worcester, Mass.

WHIPPLE, ALLEN O., B.S., M.D. Columbia University College of Physicians and Surgeons 1908, F.A.C.S. Director of Surgical Service, Presbyterian Hospital. His subject is "Safety Factors in the Treatment of Acute Intestinal Obstruction." Page 218. Address: 730 Park Avenue, New York City.

FITZ, REGINALD, A.B., M.D. Harvard 1909. Physician, Peter Bent Brigham Hospital. Associate Professor of Medicine, Harvard Medical School. He writes on "The Medical Man's Part in the Management of Acute Abdominal Lesions." Page 222. Address: Peter Bent Brigham Hospital, Boston.

GIBBON, JOHN H., M.D. Jefferson Medical College of Philadelphia 1891. Professor of Surgery, Jefferson Medical College, Surgeon to Pennsylvania Hospital, President of the American Surgical Association. The title of his paper is "The So-Called Abdominal Emergencies." Page 226. Address: 1608 Spruce Street, Philadelphia, Pa.

MISCELLANY

ONLY 225 BOYS OUT OF 2000 EXAMINED IN NEW YORK CITY FOUND TO BE PHYSICALLY NORMAL

THE Bureau of Labor Statistics reports that in an examination of 2,000 boys in New York City the great proportion of them was found to be physically defective—620 had one defect, 645 had two, 374 had three, and 135 had four or more, twenty-seven per cent had impaired vision. The boys were between the ages of 14 and 17. The study was conducted under the direction of Dr. Iago Goldston, Secretary of the New York Tuberculosis and Health Association.

CORRESPONDENCE

ANNOUNCEMENT OF THE RETIREMENT OF DR. RUSHMORE AS DEAN AND MEMBER OF THE FACULTY OF THE MEDICAL SCHOOL OF TUFTS COLLEGE

Tufts College
Office of the President
Tufts College, Massachusetts

August 5, 1927.

Editor, Boston Medical and Surgical Journal:

With very great regret I have to announce the

retirement of Dr. Stephen Rushmore from the faculty of the Medical School of Tufts College. He has resigned as Dean and as Professor of Gynecology. I am sure that you and all his colleagues share my regret at his going. We know that Dr. Rushmore undertook and carried through the responsibilities of his office with rare qualities of personality, of training and educational vision. We shall miss him sorely.

Fortunately for the Medical School, Dr. Albert Warren Stearns has been persuaded to accept the office of Dean and will take over the work on September 1. I bespeak for him your cordial support and coöperation.

Very truly yours,
JOHN A. COUSENS, President.

A STUDY OF THE INCIDENCE OF COMMUNICABLE DISEASES

The Commonwealth of Massachusetts
Department of Public Health
State House, Boston

July 28, 1927.

Editor, Boston Medical and Surgical Journal:

A study of the incidence of communicable disease in the town of Gardner is in progress. Similar studies have already been made in Winchester and Shelburne Falls under the auspices of the Massachusetts Department of Public Health. The Gardner study is sponsored by the Committee on Communicable Disease Practice of the State and Provincial Health Officers' Association and is in general charge of Dr. Crumblin, field agent of the above-mentioned association. Dr. Crumblin has associated with him Dr. Wild, who is carrying out the details of the Gardner survey.

This survey will have to do with the incidence of diphtheria, scarlet fever and measles. A house-to-house canvass will be made, taking every other house. The following questions will be asked concerning those members of the family under 20 years of age who have had one or more of the diseases already referred to:

1. In what year did the disease occur?
2. Was a physician called to the case?
3. Was the case hospitalized?
4. Was the patient a resident of Gardner at the time of illness?

Similar questions were asked in the case of the other towns surveyed, so that interesting comparisons may be possible. The Committee on Communicable Disease Practice will probably conduct another study in some other State.

Among possible gains from such a study as this now being conducted may be mentioned:

1. Information as to how many persons under 20 years of age contract diphtheria, scarlet fever or measles.
2. The approximate age at which these diseases are contracted.
3. A check on the reporting of such diseases and the number which are cared for without any physician being in attendance.
4. Interesting data on the hospitalization of communicable disease.

It is a pleasure to record the hearty coöperation being received from the medical profession of Gardner as well as from the official and unofficial organizations of the town.

Very truly yours,
GEORGE H. BIGELOW, M.D.,
Commissioner of Public Health.

RECONSTRUCTION CLINIC

366 COMMONWEALTH AVENUE

Boston, August 5, 1927.

Editor, Boston Medical and Surgical Journal:

On September 2, 1927, the Reconstruction Clinic, 36 Commonwealth Avenue, Boston (corner of Massachusetts Avenue), will open its Department of Physical Therapeutics to the public three evenings each week: Monday, Wednesday and Friday, 7 to 9 P. M.

This step was decided upon by the directors for the following reasons:

(1) Because of the abuse and misuse by non-medical men of physical therapeutic agents such as baking, massage, diathermy, ultra-violet, X-ray, etc., as the law does not make it compulsory for one to be a licensed physician to employ these agents in treating disease.

(2) Lack of institutional facilities in Boston, as well as New England, for the treatment of disease through physical therapeutic agents. At present there is but one institution open to the public in Boston or vicinity, which has a completely equipped department for physical therapeutics under men well trained in that special branch of medical practice; and this institution is open only to citizens of Boston week-days during the day.

(3) It is the intention of the directors to benefit most the man or woman who, though suffering from some illness, cannot afford to leave his or her work to seek relief. The great benefit of such aid to this particular group of sufferers is well illustrated by the last year's report of the thousands treated at the only other evening clinic open to the public; but, unfortunately, at that institution a physical therapy department is not available.

The evening clinic will be conducted by some of the regular medical staff of the institution, among whom are some of the most prominent physicians of Boston, who have volunteered their service free for this charitable cause. These facilities and medical treatment will be extended to those of limited means only, residents or non-residents, irrespective of race, creed, or color.

Continuing the policy of extending an opportunity to physicians interested in this field of therapy, the evening clinic will be opened to all physicians for observation of clinical application of physical therapeutic measures. Number accommodated limited. All those interested please communicate with secretary. There is no fee for attendance. We believe that this scientific and charitable venture merits the editorial support of your publication, and therefore submitting the above to your attention. No patient able to pay over one dollar a treatment is eligible; the average charge will be 50 cents.

Cordially yours,
RECONSTRUCTION CLINIC,
E. G. MITCHELL, M.D., Secretary.

CONNECTICUT DEPARTMENT OF HEALTH

MORBIDITY REPORT FOR THE WEEK ENDING
JULY 23, 1927

Diphtheria	16	Cerebrospinal meningitis	1
Last week	22	gitis	30
Diphtheria bacilli carriers	2	Chickenpox	2
Last week	5	German measles	2
Scarlet fever	11	Influenza	6
Last week	18	Mumps	10
Typhoid fever	2	Pneumonia, lobar	1
Last week	3	Tetanus	35
Measles	21	Tuberculosis, pulmonary	41
Last week	41	nary	27
Whooping cough	27	Tuberculosis, other forms	18
Last week	32	Gonorrhea	9
Bronchopneumonia	15	Syphilis	

DISEASE INCIDENCE IN CONNECTICUT, WEEK ENDING JULY 23

	1927				1928			
	Week ending July 2	Week ending July 9	Week ending July 16	Week ending July 23	Average cases reported for week corresponding to July 23 for past 7 weeks.	Week ending July 3	Week ending July 10	Week ending July 17
Actinomyositis	-	-	-	-	-	-	-	-
Anthrax	-	-	-	-	-	-	-	-
Botulism	-	-	-	-	-	-	-	-
Cerebrospinal Men.	1	1	2	1	1	1	-	-
Chickpox	33	36	46	30	9	35	47	29
Conjunctivitis Inf.	-	-	-	-	-	-	2	-
Diphtheria	31	13	22	16	23	7	13	11
Dysentery, Amob.	-	-	-	-	-	-	-	-
Dysentery, Bac.	-	-	-	-	-	-	1	-
Encephalitis, Epid.	-	-	-	-	-	-	1	-
Favus	-	-	-	-	-	-	-	-
Gorman Measles	5	7	-	2	1	-	-	-
Hookworm Infection	-	-	-	-	-	12	13	4
Influenza	2	2	-	2	1	1	2	-
Leprosy	-	-	-	-	-	-	-	-
Malaria	2	-	-	-	1	1	2	-
Measles	47	30	41	21	44	155	140	75
Mumps	20	21	21	6	8	-	2	2
Paratyphoid Fever	-	-	-	-	-	-	-	-
Pneumonia, (Broncho)	10	8	15	15	5	22	20	8
Pneumonia, Lobar	10	13	12	10	8	16	18	8
Polymyelitis	-	-	3	-	2	-	-	-
Scarlet Fever	23	40	18	11	21	40	39	18
Septic Sore Throat	2	3	-	-	-	-	-	1
Smallpox	-	-	-	-	-	-	-	-
Tetanus	-	-	1	1	1	-	2	2
Trachoma	-	-	-	-	-	-	-	-
Trichinosis	-	-	-	-	-	-	-	-
Tuberculosis (pul.)	29	21	55	35	33	25	17	30
Tuberculosis (o.f.)	2	7	3	1	2	1	1	6
Typhoid Fever	2	1	3	2	8	4	7	7
Typhus Fever	-	-	-	-	-	-	-	-
Whooping Cough	12	25	32	27	55	17	23	35
Gonorrhea	16	17	12	18	19	9	6	44
Syphilis	36	23	10	9	20	5	6	43
Average for two years. Made reportable Jan. 1, 1925	-	-	-	-	-	-	-	-
Remarks: No cases of cholera, icteric, glanders, plague, rabies in humans and yellow fever during the past seven years.	-	-	-	-	-	-	-	-

REPORTS AND NOTICES OF MEETINGS

ANNUAL MEETING OF THE SOUTHEASTERN MASSACHUSETTS ASSOCIATED BOARDS OF HEALTH

ABOUT eighty persons were in attendance at the annual meeting July 27, assembled at Fort Phenix, Fairhaven, of the Southeastern Massachusetts Associated Boards of Health. The election of officers resulted in the choice of W. Fred Delano of Fairhaven for president, G. Webster Hallett of Barnstable, secretary, and a board of directors.

The after-clambake session of the meeting was devoted to two matters affecting the health and business of the Cape, with Congressman Charles L. Gifford for the principal speaker. Touching on the oil pollution of the beaches in the vicinity of Cotuit, a pollution that is attributed to

the discharge of the oil-laden water blast of returning oil tankers, Mr. Gifford spoke of his efforts to interest the U. S. Public Health Service in the abatement of the nuisance. The second topic was the stand on shell fish licenses taken by the Massachusetts Department of Public Health, in its refusal to issue them to shell fishermen. The reason given for this action is the legal inability to follow up violations properly. Mr. Gifford outlined the commercial injury that would result in damaging an important industry of the Cape, and stated that the matter is of sufficient importance to warrant the calling of a short session of the legislature, to enact the necessary laws.

Some speakers suggested the intervention of the U. S. P. H. Service, while others argued that it is a State function to be better administered by the Commonwealth. It was voted that a resolution be addressed to the State Department of

Public Health, setting forth the necessity of issuing certificates as to the purity of the waters at Massachusetts shell fish grounds and also shipping certificates, in order that Massachusetts products may not be refused by other states.

ENSWORTH-CENTRAL MEDICAL COLLEGE ALUMNI ASSOCIATION

THE third annual meeting and dinner of this Association will be held in St. Joseph during the Clinical Week in Kansas City. The Interstate Post-Graduate Medical Society of North America and the Kansas City Clinical Society will hold a joint conference at the Shrine Temple, Kansas City, Missouri, October 17 to 21. The Secretary is very anxious to have a much larger attendance than last year, and for this reason is anxious to have enrolled all of the graduates of Northwestern, Ensworth-Central Medical Colleges. All graduates are urged to send their names to Charles Geiger, M.D., President, St. Joseph, Missouri; Charles Wood Fassett, M.D., Secretary, 115 East 31st St., Kansas City, Mo.

NEW HAMPSHIRE SURGICAL CLUB

THE 29th annual meeting of the New Hampshire Surgical Club was held at Keene, N. H., May 3rd, 1927. An operative clinic took place at the Elliot Hospital during the forenoon when three interesting operations were performed by Drs. Barney, Lund and Stone of Boston. A helpful discussion followed. Luncheon was served at the hospital and the following program was given at the normal school assembly hall during the afternoon:

AFTERNOON SESSION

"The Treatment of Empyema in Children by the Closed Method Suction Drainage," David W. Parker, M.D. Discussion: Thomas C. Luce, M.D.; George Dwinnell, M.D.

Practical Application of the Laboratory as Relates to Urine Analysis and Blood Chemistry," W. Richard Ohler, M.D., Boston. Discussion: H. N. Kingsford, M.D.; O. H. Hubbard, M.D.

"Joint and Bone Infections in Children," James S. Stone, M.D., Boston. Discussion: Arthur W. Shea, M.D.; Carleton Metcalf, M.D.

There were about 100 present at the meeting. The Keene members, Dr. Ira Prouty, chairman, acting as committee of arrangements, are to be congratulated on the outstanding success of the meeting. President Eugene B. Eastman of Portsmouth presided.

The following officers were elected:

President, Eugene B. Eastman, M.D., Portsmouth; Vice-President, E. M. Miller, M.D., Woodsville; Secretary and Treasurer, John F. Holmes, M.D., Manchester. Executive Committee—President and Secretary-Treasurer, ex-officio; Daniel C. Norton, M.D., Manchester;

John F. Gile, M.D., Hanover; Carleton Metcalf, Concord.

The 30th annual meeting of the club will take place at Laconia, N. H., Sept. 19th, 1927. As usual this meeting is planned as a week-end outing and arrangements are being made at Laconia to entertain the doctors, their families, and guests beginning Sept. 17th. There are abundant facilities for out-of-door recreation, golf, swimming, and bathing, automobile tours, fishing, etc. Laconia is well chosen as the place for meeting, being accessible and well equipped. The committee of arrangements consists of the Laconia members of the club, Dr. Clifford Abbott, chairman.

NOTICES

CORRECTION

IN the book review of "Modern Medicine" which appeared in our JOURNAL of July 28, 1927, page 161, McPhedran was incorrectly spelled. The name as it appears here is correct.

REMOVAL

DR. CHARLES SPIVA has moved from 1680 Acushnet Avenue, New Bedford, Mass., to 1786 Acushnet Avenue, New Bedford, Mass.

BOOK REVIEW

City Health Administration. By CARL E. MCCOUMBS, M.D. National Institute of Public Administration and New York Bureau of Municipal Research. Macmillan Company, New York. 1927.

The author divides this book of 500 pages into three parts:

- I. Municipal Health Functions.
- II. The Organization and Administration of Sickness Preventive Functions.
- III. The Organization and Administration of Sickness Treatment Functions.

In his introduction the author states that his book has in view the needs of the person "without professional training or experience, whether he is a teacher or student of government, a public official, or merely the 'man in the street' who wants to know what health benefits he should have for his tax payments."

The book is very largely an elaborate exposition of the scheme of public health administration in New York City. It is well calculated to familiarize the tax payer with conventional practices of today in spending money for the supposed promotion of public health, but the author is inclined to be dogmatic regarding matters which are debatable and does not furnish the help which might be expected by a "man in the street" who might like to know whether certain popular and expensive health promotion projects are really justifying their cost.